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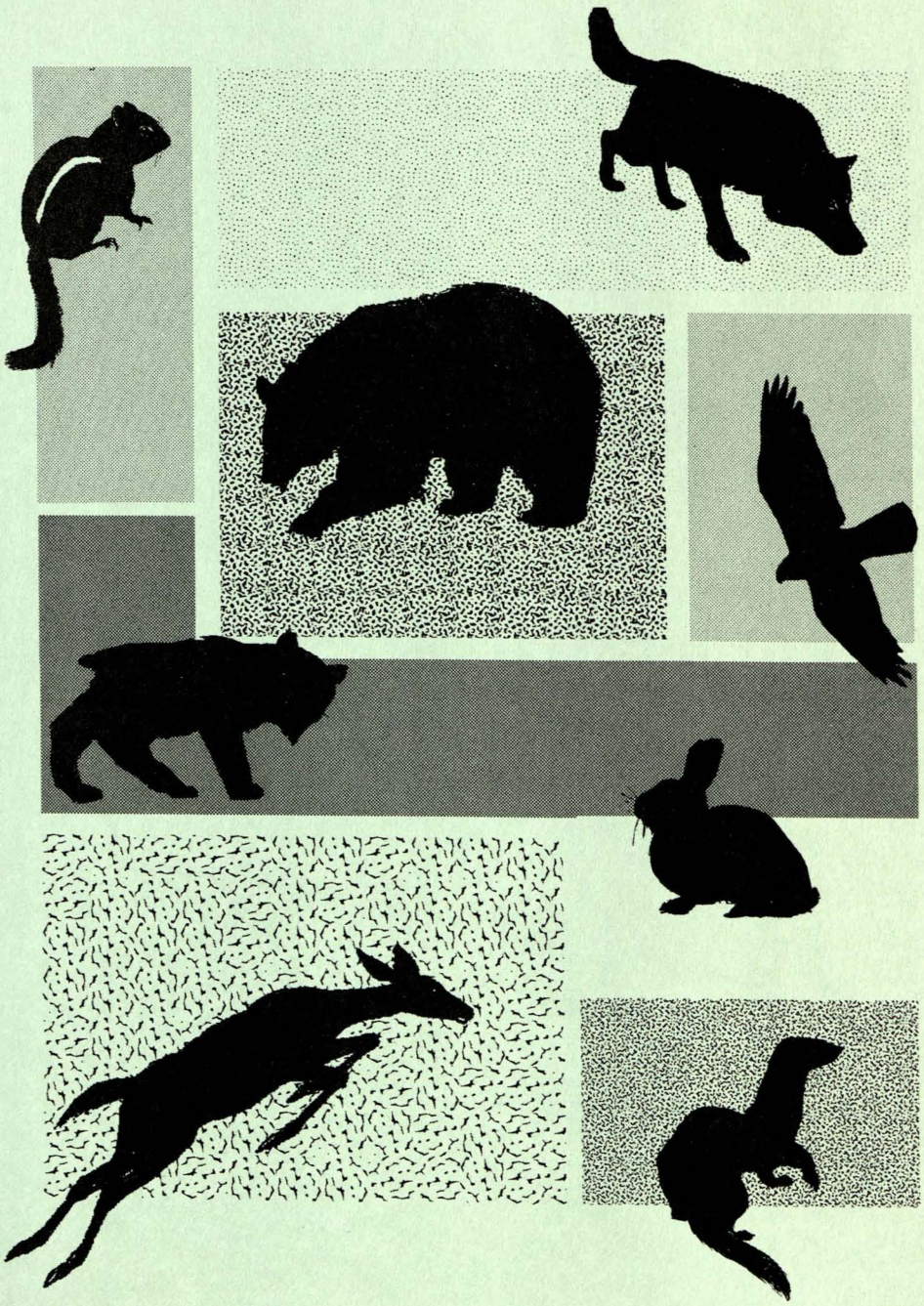
Wildlife in the Upper Great Lakes Region: A Community Profile

Janine M. Benyus, Richard R. Buech, and Mark D. Nelson



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Wildlife Of The Upper Great Lakes Region: A Community Profile

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This publication describes the wildlife community in the upper Great Lakes region (fig. 1) in graphic and tabular form. It displays the great diversity of species in our region, and tells us something about their needs and the ways they relate to one another and to their habitats. Land managers can use this information to create better living conditions for Lake States wildlife.

There is a great need for informational tools such as this. As our appetite for land and natural resources grows, we threaten to alter the conditions that Lake States wildlife depend on for survival. To understand the magnitude and nature of our impact, we must first know what kinds of wildlife species live in our region, and what their habitat needs are. Second, we must know how our activities will affect the quality of these habitats, and consequently, the well-being of the wildlife community.

Making the connection between our actions and wildlife welfare requires us to analyze large amounts of information. We have tried to simplify this process by displaying wildlife-habitat information in two forms in this publication: (1) graphic charts, and (2) a species-habitat matrix. The pie charts, bar charts, and histograms shown throughout this publication provide at-a-glance views of trends and patterns in wildlife-habitat relationships. The Lake States species-habitat matrix (Appendix) displays 389 species of birds, mammals, reptiles, and amphibians with their associated habitats, thus providing more specific information about wildlife in the upper Great Lakes region. Both the charts and the matrix were generated from NORTHWOODS, an electronic data base that contains wildlife-habitat information compiled from seven National Forest data bases.

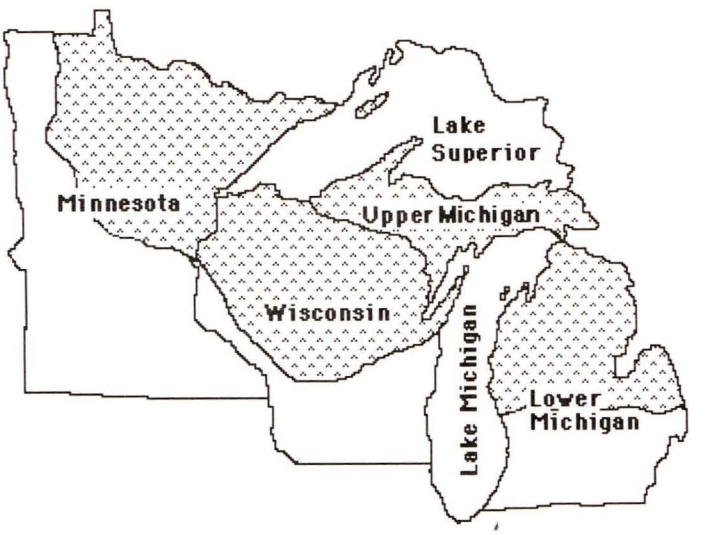

Figure 1.— *Geographic region covered by the wildlife community profile.*

This publication and the data base behind it are unique in that they organize species-habitat information on a regionwide scale. Up to this point, individual National Forests worked with inventories that characterized only their Forest. They had no means of comparing their own Forest with the rest of the upper Great Lakes region.

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We have much to gain by looking beyond political boundaries and seeing the upper Great Lakes region as an ecosystem with common ecological characteristics and a shared history. The forces that helped shape this landscape (*e.g.*, Native American culture, the logging era, and the spread of agriculture) changed not just a single Forest or county, but an entire countryside. Today, land management practices on private and public lands continue to shape the ecosystem as a whole. Fortunately, our growing knowledge of natural systems allows us to manage these lands with more foresight than in the past. At the same time, however, suburban sprawl, habitat fragmentation, acid rain, and, possibly, global climate change are altering the Lake States landscape in unforeseen ways. This publication is designed to help us predict how both planned and unplanned habitat changes may affect wildlife. Once aware, we can focus our efforts on protecting sensitive species and enhancing habitats for the entire community.

By developing analytical tools like this one, the Wildlife and Fish Habitat Management Research work unit of the North Central Forest Experiment Station aims to help managers maintain or increase diversity and viable populations of wildlife, fish, and plants at desired ecological levels. Our research, like this data base and matrix, has a regionwide focus.

Using the Lake States Matrix: On a daily basis, land managers can use the matrix to predict how individual management activities might impact the wildlife community at a particular location. For instance, a wildlife biologist working on a timber sale team could use the matrix to compile a list of species that might be adversely affected by the removal of mature trees, as well as those that might benefit from the increase in regeneration-stage habitat. This list could then be used as a reference when conducting further field studies. Because all the species information is in a common format, land managers can consider the needs of more than one species at a time, allowing them to design habitat projects that will benefit diverse wildlife species.

The matrix can be particularly useful in long-term forest planning. Using simulation models, planners can postulate what a Forest will look like in 10, 15, or even 50 years, given a range of management scenarios. Once they determine how many acres and what types of habitat will be available, they can use the matrix to predict the makeup of the wildlife community. Because the information is in a tabular format, it is easy to make lists of all endangered, threatened, or sensitive species, and then look at the habitats where they occur. If most of the species use a certain habitat, it may be logical to focus protection efforts on this habitat. In the same way, the matrix can help managers flag species that are not very versatile and therefore sensitive to change. These species may not be in danger today, but if their habitats were somehow threatened, they could be in danger tomorrow.

The matrix can also help managers monitor changes in the wildlife community through time. Knowing what species to expect in certain habitats enables managers to spot problems early; when, for instance, habitats that once had a diverse roster of wildlife species suddenly become less diverse.

The matrix may also help people who are interested in encountering wildlife and learning more about their needs and preferences. Wildlife watchers, photographers, hunters, trappers, and others can look up the species they want to see and then visit each of the habitats in which the species is known to occur. If a species is known to specialize in only one or two habitats, the search is narrowed down even further. Conversely, users can look up the habitat they are currently visiting, noting all the species in that column that they should be on the lookout for. By customizing searches in this way, matrix users can increase their chances of seeing animals.

Finally, the matrix can be used to create graphic representations of data such as those presented in this publication.

Using the Graphic Profile: The charts on the following pages present a regional view of Lake States wildlife, allowing managers to see how their own community fits into a larger, interconnected ecosystem. This broad view enables managers to generalize about Lake States wildlife, uncovering trends or patterns that they

would miss in a more localized view of the world. These generalizations can show managers where to direct habitat enhancement or protection efforts, and how to coordinate these projects on a regional scale.

We chose to structure this information in a visual form because graphs can often illuminate findings more clearly than numerical data sets can. Once the data are transformed into a bar or a curve, we can easily make comparisons. It is when we begin to compare—to see differences—that we gain insights about the complexity of wildlife and their varying needs.

BUILDING THE DATA BASE

The information in this publication was gleaned from NORTHWOODS, the electronic data base that we created while researching a book entitled "Northwoods Wildlife: a Watcher's Guide to Habitats" (Benyus, Janine. 1989. NorthWord Press. Minocqua, WI. 453 p.). To create NORTHWOODS, we first examined the wildlife-habitat inventories that were being used on the seven National Forests in northern Minnesota (Chippewa, Superior), Wisconsin (Chequamegon, Nicolet), and Michigan (Hiawatha, Ottawa, and Huron-Manistee).[1] The raw data for these inventories were generated in much the same way on each Forest. A panel of experts from the area drew up a wildlife species list for the Forest, and then matched species with the habitats they use. These associations were based on direct field experience, a review of the literature, and professional opinion. Although the resulting inventories were somewhat subjective, they represented the best estimates available.

The inventories for each Forest were stored in different formats, ranging from pencil-and-paper tally sheets to elaborate electronic systems. Because we wanted to compare the seven inventories, we converted them to a common format and computerized them to create seven separate data bases. Each data base contains baseline information about the wildlife community on that Forest—species names, the habitats they occur in, their season of use, and their abundance. After we converted the inventories into data base form, the wildlife biologists on each Forest checked them for accuracy and updated them to reflect the most recent knowledge.

The second step was to combine the information from the seven Forests to create a new data base for the upper Great Lakes region, which we called NORTHWOODS. We included all species that were present on at least one Forest, but disregarded some "accidental" species reported on some Forests. We used a majority scoring system to determine whether species would be classified as present or absent in each habitat. If 50 percent or more of the Forests where the species occurred considered the species present in a habitat, we marked it as present in NORTHWOODS. The abundance rating for each species refers to its abundance *throughout* the upper Great Lakes region. A species whose natural range touches only a small corner of the upper Great Lakes region may be common in that corner, but uncommon throughout the rest of the region. In NORTHWOODS, therefore, the species would be listed as uncommon. Definitions of the other categories used in NORTHWOODS are listed below. These definitions also apply to the Lake States matrix (see Appendix), which was generated from the NORTHWOODS data base.

DEFINITIONS

Class

b = birds
m = mammals
h = herps (reptiles and amphibians)

Habitats

Lake.—A body of permanent water more than 10 acres in size, and usually more than 6 feet deep. Includes beaches and mud flats.

Pond.—A body of permanent water less than 10 acres in size and usually less than 6 feet deep.

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[1] *The first computerized wildlife-habitat inventory in the Northeastern Region of the USDA Forest Service was designed on the Chippewa National Forest and published in 1980. This data base was used as a model for creating NORTHWOODS. For more information, see Mathisen, J.E. 1980. Wildlife Habitat Associations: A data base. U.S. Department of Agriculture, Forest Service, Chippewa National Forest. 114 p.*

River and stream.—A body of permanent flowing water; includes open water, the bed, the banks, and the vegetated areas along the banks.

Marsh.—A shallow basin with 6 inches to 3 feet of standing water throughout much of the year. It is vegetated nearly shore-to-shore with herbaceous aquatic plants, persistent and nonpersistent, including cattails, bulrushes, pondweeds, water lilies, and wild rice.

Sedge meadow.—A saturated alkaline peatland covered mostly by sedges and fed by minerals washing in from the surrounding lands. The surface is at or only slightly above the water table. Open pools of water are common in spring because of flooding.

Shrub swamp.—A wetland thicket dominated by 10- to 15-foot-tall alder and willow shrubs, and underlain with wet muck soil. There are often streams trickling through the swamp, and it is occasionally flooded.

Bog.—A mat of wet, nutrient-poor, acidic peat topped with sphagnum moss and ericaceous plants and shrubs. A bog is a closed system, with no streams feeding in or out. Often, a dark pool of stagnant water will be in the center.

Small grass opening.—An upland opening 1 to 3 acres in size, covered by a layer of permanent sod and containing few or no trees.

Large field.—An upland opening larger than 3 acres, covered by a permanent layer of sod and containing few or no trees.

Shrub-sapling opening.—An upland opening with a dense shrub layer and a well-developed herbaceous layer. This is a regenerating forest, coming in 3 to 12 years after logging, fire, or other disturbance.

Young upland deciduous forest.—A 12- to 30-year-old forest with closely spaced, pole-sized trees 10 to 30 or more feet tall, and a variable shrub and herbaceous layer. Aspen, birch, northern hardwoods, and oaks are found in various combinations, with few or no conifers.

Mature upland deciduous forest.—A closed-canopy forest with trees more than 30 years old, an overstory 30 or more feet tall, and a variable shrub and herbaceous layer. Characteristic species include aspens, birches, and northern hardwoods (especially sugar maple). Old stands with broken or uneven canopies may have well-developed underlayers, downed logs, and standing snags with cavities.

Young upland coniferous forest.—A 12- to 30-year-old forest densely populated with trees that are 10 to 30 feet tall. In some places, the shade is so intense that shrubs and ground plants are sparse. More often, these stands will have a savanna appearance, with numerous small openings interrupting the tree coverage. Characteristic species include jack pine and oak in combination, and less frequently, red pine, white pine, white spruce, and balsam fir.

Mature upland coniferous forest.—A closed-canopy forest with trees older than 30 years, an overstory taller than 30 feet, and a sparse shrub and herbaceous layer. Old stands with uneven or broken canopies may have well-developed underlayers. Characteristic species include balsam fir, usually in combination with white spruce, and red pine, white pine, and jack pine.

Young upland mixed forest.—A 12- to 30-year-old forest with closely spaced, pole-sized trees that are 10- to 30-feet tall, and a variable shrub and herbaceous layer. These stands may include jack pine, red pine, or white pine in combination with deciduous species such as paper birch and red oak.

Mature upland mixed forest.—A mixture of deciduous and coniferous trees growing together, with trees older than 30 years, an overstory more than 30 feet tall, and a variable shrub and herbaceous layer. Old stands with broken or uneven canopies may have well-developed underlayers, downed logs, and standing snags with cavities. Characteristic species include white spruce, balsam fir, red pine, white pine, jack pine, sugar maple, eastern hemlock, paper birch, and American beech.

Semi-open lowland coniferous forest.—A bog that has begun to fill in with scattered clumps of tamaracks and black spruces, usually less

than 20 feet tall. The surface is carpeted with a dense, low-lying layer of ericaceous shrubs, sphagnum moss, and wildflowers. It is often wet because the surface is at or close to the water table.

Closed-canopy lowland coniferous forest.— A dense forest of closely spaced trees up to 60 feet high, growing atop an unstable carpet of mosses. The shrub layer is usually sparse due to the heavy shade. Characteristic species include black spruce, tamarack, northern white-cedar, and balsam fir.

Young lowland deciduous forest.— A 12- to 30-year-old forest with pole-sized trees 10 to 30 feet tall and a variable shrub and herbaceous layer. The soil is muck or peat and may be covered with water during parts of the year. Characteristic species include black ash, red maple, balsam poplar, and speckled alder.

Mature lowland deciduous forest.— Closed-canopy forest with trees older than 30 years, an overstory taller than 30 feet, and a variable shrub and herbaceous layer. The soil is muck or peat and may be covered with water during parts of the year. Typically, a stream or river runs through the forest. Characteristic species include red maple, black ash, and a few American elms.

Note: Definitions adapted from: Benyus, Janine. 1989. *Northwoods Wildlife: A Watcher's Guide to Habitats.* Minoqua, WI: Northword Press. 453 p.

Forest Name

Chippewa National Forest
Superior National Forest
Chequamegon National Forest
Nicolet National Forest
Ottawa National Forest
Hiawatha National Forest
Huron-Manistee National Forests

Abundance

Common (c) = present in good numbers in suitable habitats. Individuals or sign can usually be seen if you know where to look.

Uncommon (u) = present, but in lower numbers due to range limits, large home ranges, specific habitat requirements, or other factors. Usually more difficult to find because there are fewer individuals per acre.

Occasional (o) = may not occur every year, but because of proximity to their regular range, individuals can be expected to wander into the region during some years, *e.g.*, at intervals during periods of severe weather or food shortages.

Blank = not present on Forest.

Season of Use

P = permanent year-round resident
S = summer resident (breeding)
M = migrant (present spring and fall)
W = winter resident

Status

Federal Status: U.S. Department of Interior Fish and Wildlife Service (USFWS) [2]

E = Federally Endangered: Any species that is in danger of extinction throughout all or a significant portion of its range.

T = Federally Threatened: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

R = Under Review: now being studied to see whether the species should be listed. USFWS C1 and C2 species.

No classification (blank) = indicates that species does not have an official status as either endangered, threatened, or under review on USFWS list.

Versatility

The versatility score for each species is simply the total number of habitats that it uses. The more habitats that a species uses, the more

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[2]*Office of the Federal Register. 1991. Department of the Interior Fish and Wildlife Service. Endangered and threatened... Federal Register. 56(215): 56882-56900.*

versatile it is; the fewer habitats it uses, the less versatile it is. The # sign indicates that 10 or more habitats are used by the species.

CREATING THE GRAPHICS

By querying the computerized version of NORTHWOODS, we generated a series of numerical answers to questions such as "What proportion of total species are migrants?" We then converted these answers into graphics. This is one example of how the data base might be used; many other questions could be asked to reveal a whole new set of findings about our wildlife community.

For the most part, the terms used in the graphics are identical to those used in the data base. One exception is the "habitat groups," a designation created specifically for the graphics portion of this publication. To simplify comparisons of habitat use, we grouped the 20 habitats into broad categories such as wetlands, forests, openings, and aquatic types. Below, in bold type, are the groupings and the habitats that make up each group.

Habitat Groupings

Aquatic
- Lake
- Pond
- River

Wetlands
- Marsh
- Sedge meadow
- Shrub swamp
- Bog

Openings
- Small grass opening
- Large field
- Shrub-sapling opening

Forests
- Young upland deciduous
- Mature upland deciduous
- Young upland coniferous
- Mature upland coniferous
- Young upland mixed
- Mature upland mixed
- Semi-open lowland conifer
- Closed-canopy lowland conifer
- Young lowland deciduous
- Mature lowland deciduous

Lowland Forests
- Semi-open lowland conifer
- Closed-canopy lowland conifer
- Young lowland deciduous
- Mature lowland deciduous

Young Forests
- Young upland deciduous
- Young upland coniferous
- Young upland mixed
- Young lowland deciduous

Mature Forests
- Mature upland deciduous
- Mature upland coniferous
- Mature upland mixed
- Mature lowland deciduous

Deciduous Forests
- Young upland deciduous
- Mature upland deciduous
- Young lowland deciduous
- Mature lowland deciduous

Coniferous Forests
- Young upland coniferous
- Mature upland coniferous
- Semi-open lowland conifer
- Closed-canopy lowland conifer

Mixed Forests
- Young upland mixed
- Mature upland mixed

Upland Forests
- Young upland deciduous
- Mature upland deciduous
- Young upland coniferous
- Mature upland coniferous
- Young upland mixed
- Mature upland mixed

A PROFILE OF THE LAKE STATES WILDLIFE COMMUNITY

When we step back and take a large-scale view of Lake States wildlife, we see that the 389 species in our region form a single assemblage with a distinct character. Birds dominate this group by an overwhelming margin (fig. 2), comprising nearly three-fourths of all species. Mammals and herps (reptiles and amphibians) comprise the remaining one-fourth. In figure 3, you can see that only about one-third of all species remain in the area year-round; 40 percent of them are summer-only residents, leaving for warmer climates when the temperatures drop and food supplies dwindle. Visitors such as migrants (22 percent) and winter residents (3 percent) are also in the area only a few weeks or months out of every year.

Most of the species listed in NORTHWOODS occur in all seven National Forests, but some are unique to a particular locale. To highlight differences among the Forests, we shaded the bars in figure 4 to represent the unique species on each Forest and arranged the Forests geographically (left to right) from west to east. Although the actual number of unique species is small, the Chippewa and the Huron-Manistee have the greatest share of these species perhaps because these Forests are on the eastern and westernmost fringes of the area.

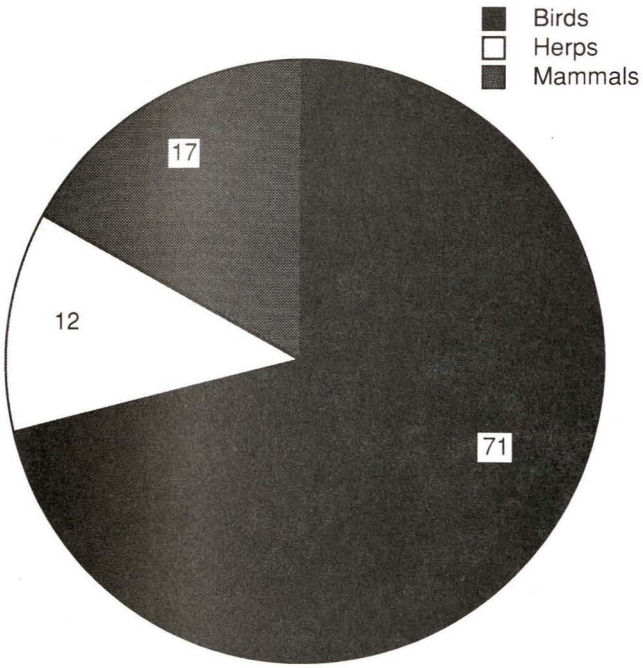

Figure 2.— *Species by class. Percent of total species that are birds, herps (reptiles or amphibians), or mammals.*

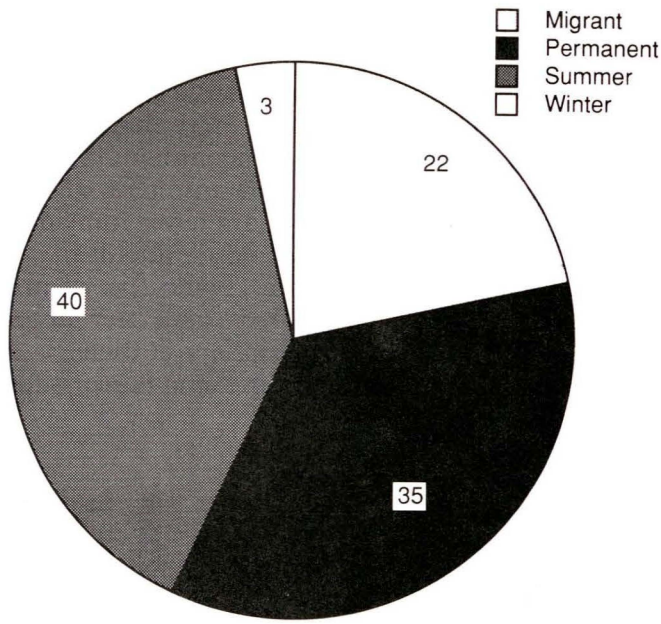

Figure 3.— *Species by season of use. Percent of total species that are migrants, permanent residents, summer residents, or winter visitors.*

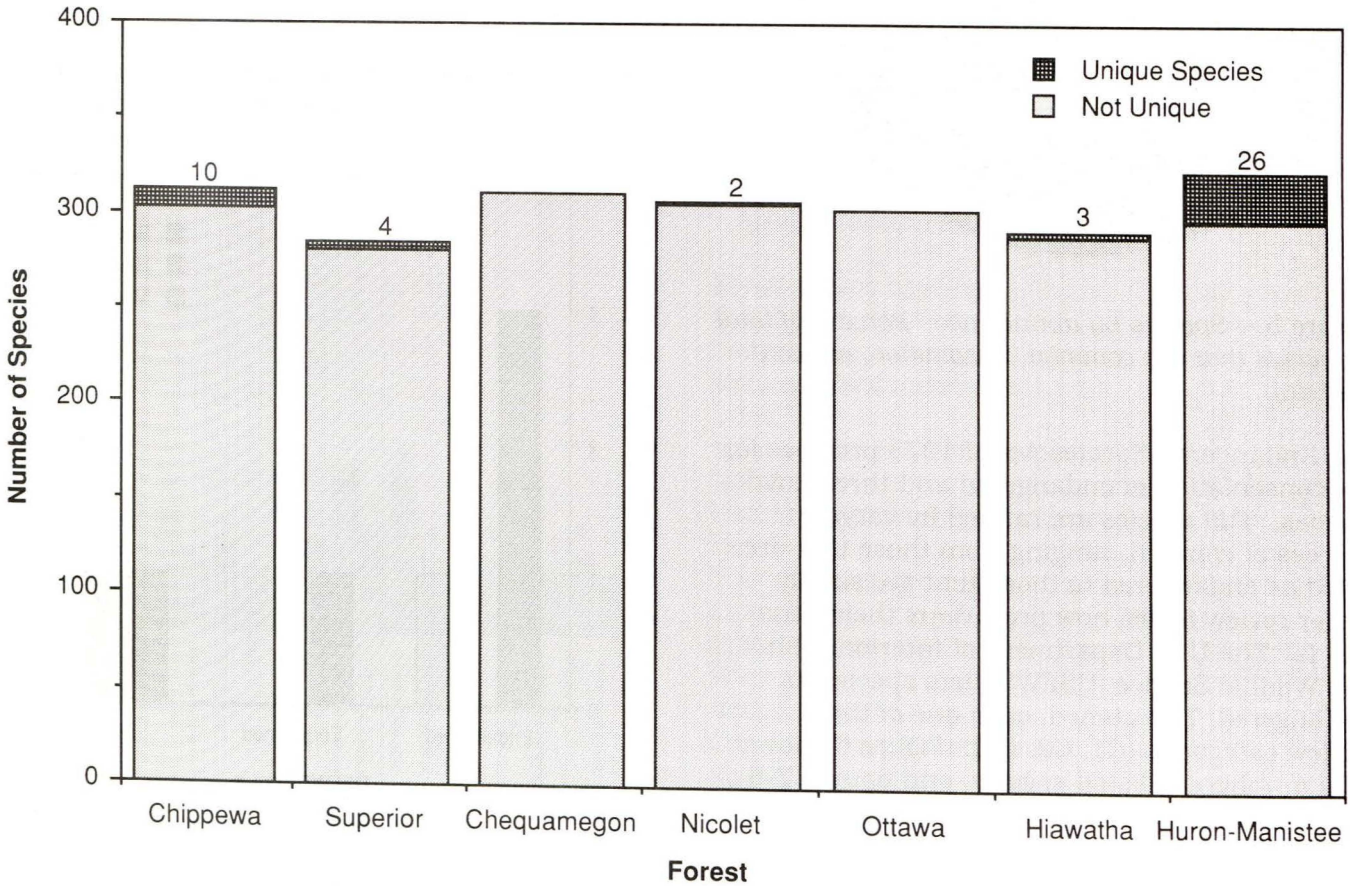

Figure 4.— *Species by Forest. Number of total species that occur on each National Forest. The dark portion of the shaded bar represents those species that are unique to each Forest.*

When seen in composite view, the abundance ratings for species in the upper Great Lakes region (fig. 5) yield surprising results that are valuable for managing wildlife. More than half of the species, for instance, are uncommon; that is, they are present in relatively low numbers in their habitats. Because there are fewer individuals per acre, they are usually more difficult to find than common species are. Some species are uncommon simply because they roam over large home ranges or are at the periphery of their range, but others have more pressing reasons for low populations.

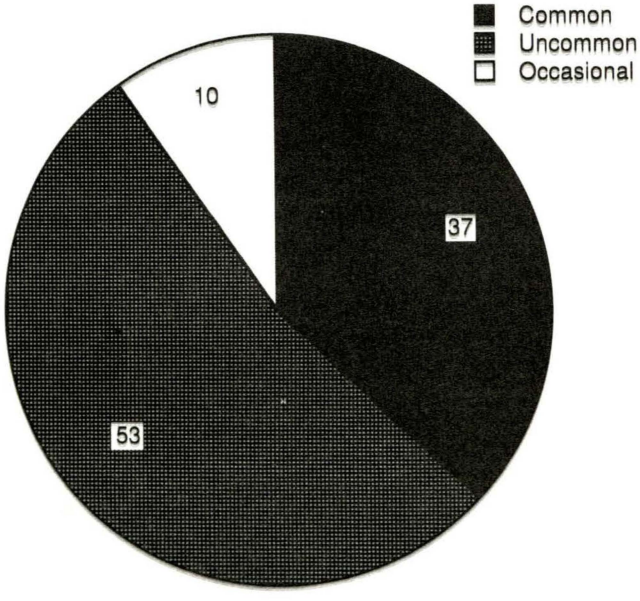

Figure 5.– *Species by abundance. Percent of total species that are common, uncommon, or occasional.*

The Endangered Species Act of 1973 provides for the conservation of endangered and threatened species. The species are ranked by varying degrees of concern, ranging from those that are listed as endangered to those that are simply under review to see how precarious their situation is. The U.S. Department of Interior, Fish and Wildlife Service (USFWS) lists species as Endangered, Threatened, or in one of three Review categories (C1, C2, C3). Figure 6 shows total numbers of listed species, and figures 7-8 show breakdowns of listed species by class. At this time, 2 percent of species in the upper Great Lakes region have been given the special status Endangered, Threatened, or Review. When these

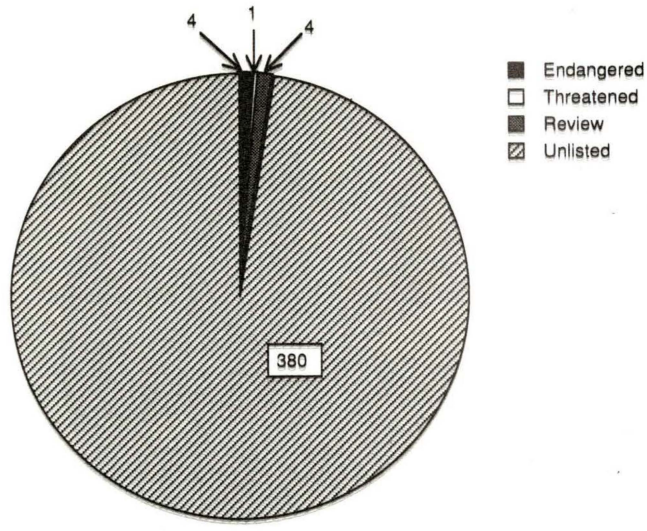

Figure 6.– *Number of special status species on the U.S. Fish and Wildlife Service's list.*

species are broken down by class, 2 percent of birds, 2 percent of herps, and 5 percent of mammals need special management to prevent further declines.

For many of these species, the key to rebuilding populations is having access to enough of the

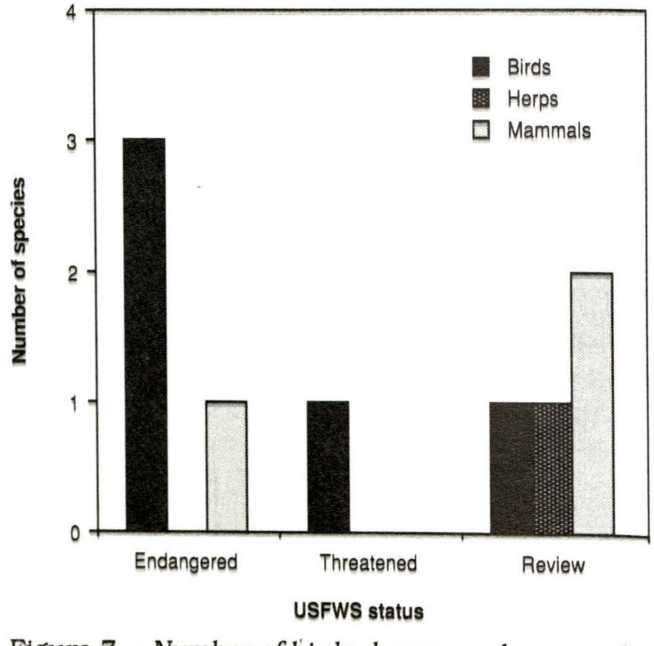

Figure 7.– *Number of birds, herps, and mammals listed as special status species by the U.S. Fish and Wildlife Service (USFWS).*

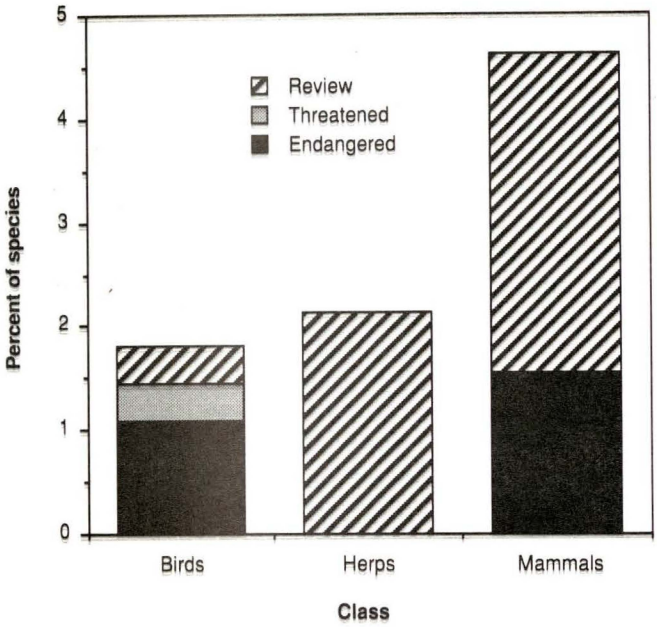

Figure 8.— *Percent of birds, herps, and mammals listed as special status species by the U.S. Fish and Wildlife Service.*

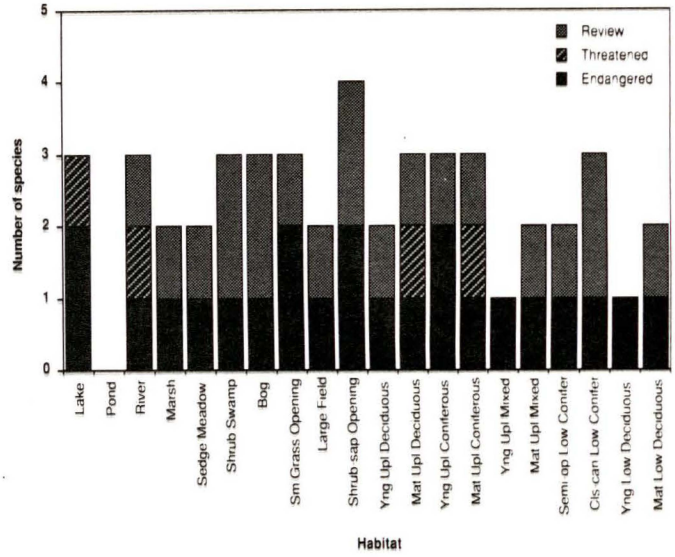

Figure 10.— *Number of special status species on the U.S. Fish and Wildlife Service's list that use each habitat.*

right kinds of habitats. As we attempt to manage the mosaic of habitats in the upper Great Lakes landscape, it helps to know which habitats are heavily used by wildlife and which are most vital to endangered species. Figure 9 shows what proportion of the total community uses each of the 20 habitats in the data base. Figure 10 shows habitat use among USFWS-listed species. Tables 1 and 2 display habitat use for the two groups in descending order.

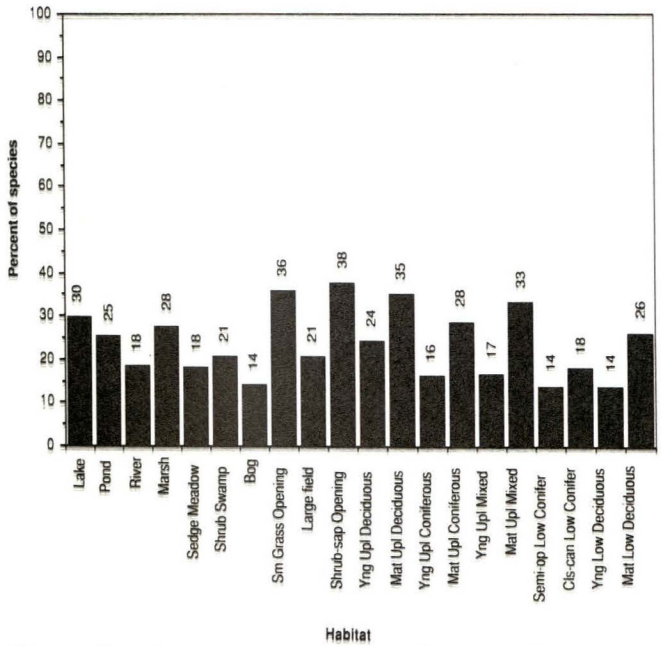

Figure 9.— *Species by habitat. Percent of total species that use each habitat.*

Table 1.— *Percentage of total species using each habitat (adapted from figure 9)*

Shrub-sapling opening	37
Small grass opening	35
Mature upland deciduous forest	35
Mature upland mixed forest	33
Lake	29
Mature upland coniferous forest	28
Marsh	27
Mature lowland deciduous forest	25
Pond	25
Young upland deciduous forest	24
Large field	20
Shrub swamp	20
River	18
Sedge meadow	18
Closed-canopy lowland forest	17
Young upland mixed forest	16
Young upland conifer forest	16
Bog	14
Semi-open lowland conifer forest	13
Young lowland deciduous forest	13

Table 2.– *Percentage of USFWS-listed species using each habitat (adapted from figure 10)*

Shrub-sapling opening	44
Shrub swamp	33
River	33
Bog	33
Lake	33
Mature upland coniferous forest	33
Closed-canopy lowland conifer forest	33
Mature upland deciduous forest	33
Small grass opening	33
Young upland conifer forest	33
Marsh	22
Sedge meadow	22
Large field	22
Young upland deciduous forest	22
Mature upland mixed forest	22
Mature lowland deciduous forest	22
Semi-open lowland conifer forest	22
Young lowland deciduous forest	11
Young upland mixed forest	11
Pond	0

Habitat use can be simplified by grouping similar habitats into categories such as openings, forests, wetlands, or aquatic types. Figures 11-14 show what percentage of total species use these habitat groups. Wildlife species that occur in more than one habitat may be represented by more than one habitat group.

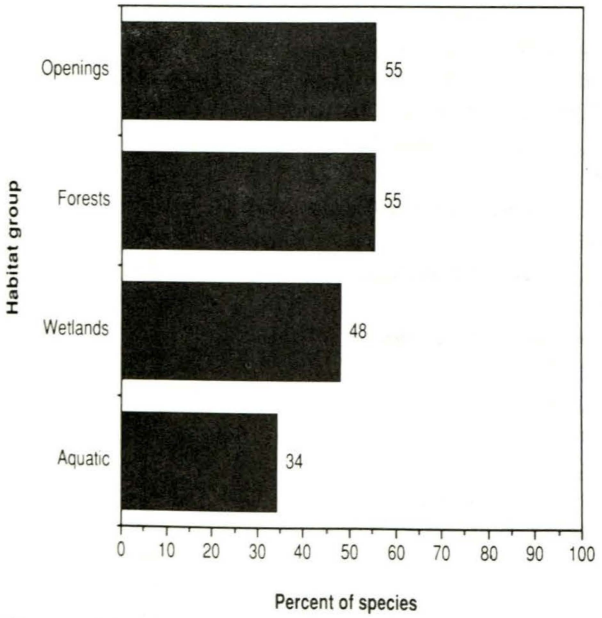

Figure 11.– *Species by habitat group. Percent of total species that use aquatic habitats, wetlands, openings, and/or forests.*

To explain the "species richness" (*i.e.*, the number of species present) in each habitat group, it helps to know something about what they offer to wildlife. Open habitat types (fig. 11) offer a break in the heavy shade of the forest. The sunlight encourages succulent forbs, grasses, and invading shrubs and saplings– all of which provide food for wildlife in the form of leaves, seeds, twigs, buds, tubers, and berries. Openings are a good food source not only in the summer, but also between seasons. Early snowmelt allows grasses to green up first in the spring, and cool-season grasses are still available in the fall when summer plants in most other habitats are gone. Insects are attracted to the profusion of plants in a field, and, in turn, insect-eating songbirds find a home here. The openness of a meadow also gives soaring predators such as hawks a good view of their prey. Besides food, openings provide workable soil that is good for burrowing, and a dense covering of grasses that is tall enough to hide small rodents. When shrubs and saplings begin to take root, they provide nest sites, nest-building materials, cool shade, shelter from the wind, and visual cover for animals passing through.

The high species richness in openings may be due to the fact that many species from other habitats visit openings to fulfill some of their needs. Forest-nesting species, for instance, may visit openings to hunt at night or to sun themselves during the day. Edge-adapted species, which dwell at the juncture of the field and the forest, may also venture into the opening. Predators and nest parasites, attracted by the prey traffic and high incidence of nesting at edges, also visit the area. When you combine these four communities (field species, forest species, edge species, and their predators and nest parasites), the total tally of species using openings becomes inflated. As you can see in Figure 9, small openings, which are readily accessible to surrounding forests, are used by more species than large openings are. Nevertheless, large openings are also important, especially to prairie species that depend on wide expanses of grass.

Figure 11 also shows that forests are as rich in species as openings are. Among the forested types, mature forests are highest in species richness (fig. 12). These forests have a ground layer, shrub layer, and canopy. Each level

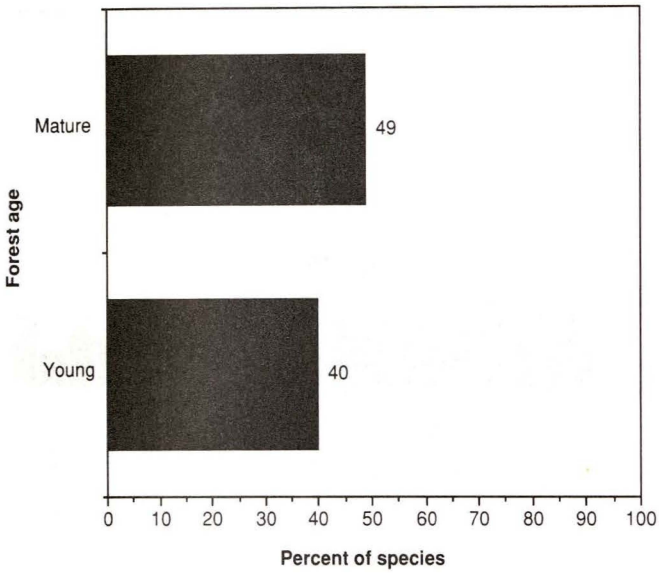

Figure 12.– *Species by forest age. Percent of total species that use young and/or mature forests.*

provides a different menu of food, cover, and nesting sites, and each has its own list of inhabitants. Because of their age, mature forests have large-trunked trees that are likely to have cavities for wildlife dens, or to be filled with wood-boring insects that woodpeckers seek. Downed logs and a well-developed litter layer provide shelter to amphibians, reptiles, and mammals. In turn, this forest floor community feeds predators such as hawks, owls, and weasels. Deciduous forests attract more species than coniferous forests (fig. 13) perhaps because of the lush understories

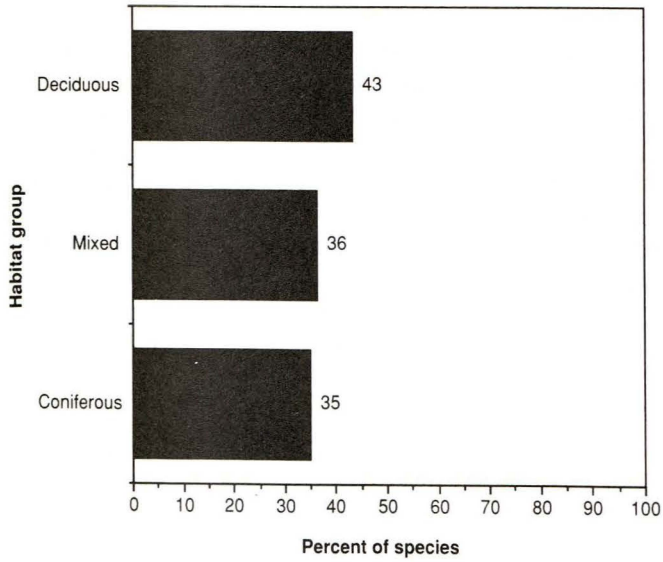

Figure 13.– *Species by forest type. Percent of total species that use deciduous, mixed, and/or coniferous forest.*

and varied selection of wildlife foods in deciduous forests. Upland forests also have a higher species richness than lowland forests (fig. 14).

If you examine figure 9 again, you'll notice that species richness drops in the age class between regenerating forests (shrub-sapling openings) and mature forests. These young, pole-sized forests receive relatively little use, especially from herps. It may be that the close-growing trees cast too much shade, discouraging nutritious ground plants that would otherwise provide food, cover, or nest sites. The trees themselves are too young to bear copious seed crops, or to support the wood-boring insects that attract insectivores. Decay-caused nesting cavities are rare, and there

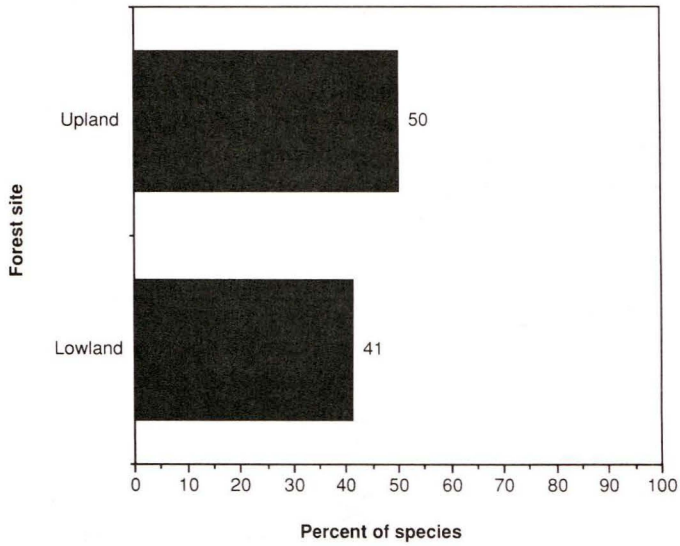

Figure 14.– *Species by forest site. Percent of total species that use upland and/or lowland forests.*

are few dead and down logs to provide housing for small mammals and herps. To their credit, however, dense young forests do offer hiding places for some birds and larger mammals such as deer. Twigs, leaves, and buds are also available for those tall enough to reach the lower branches of the young trees.

Wetlands and aquatic habitats follow forests in the ranking according to species richness (fig. 11). Like openings, wetlands and aquatic habitats are frequently visited by wildlife from other habitats. Wetlands offer a large variety of plant

and animal food, as well as water to drink, shoreside vegetation to hide in, and a watery escape from enemies. Lakes and marshes are most widely used, with ponds and shrub swamps following closely behind. Rivers, sedge meadows, and bogs are less widely used, attracting about the same proportion of species as large grass openings and young forested types do. Keep in mind that the ranking of aquatic habitats is deceptive because, except for a few amphibian species, we are considering only terrestrial vertebrates in this data base. If we were to include fish in NORTHWOODS, the water-oriented habitats would show a higher level of use.

Habitat use differs among birds, mammals, and herps (fig. 15). Birds tend to use openings more than any other habitat group, but forests and wetlands are also important to them. Mammals, on the other hand, seem to gravitate to forest types and openings, while the highest percentage of herps occurs in aquatic types. To give you more detail, we have included the full habitat charts for each class in figures 16-18.

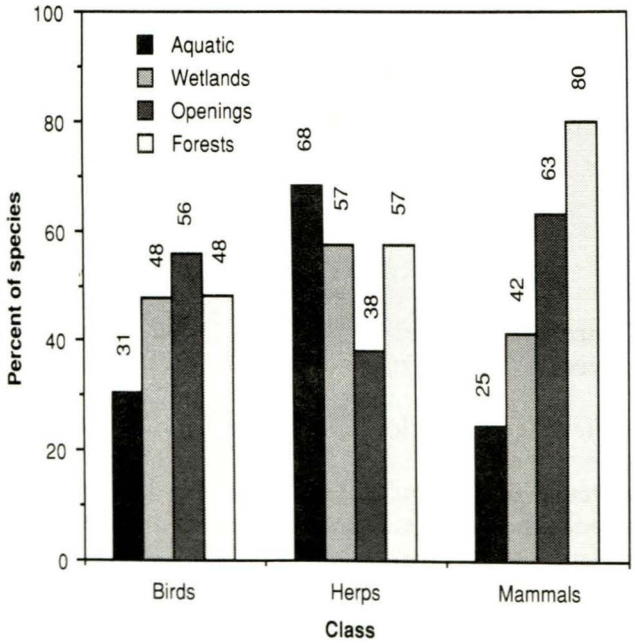

Figure 15.– *Class by habitat group. Percent of birds, herps, and mammals that use aquatic habitats, wetlands, openings, and/or forests.*

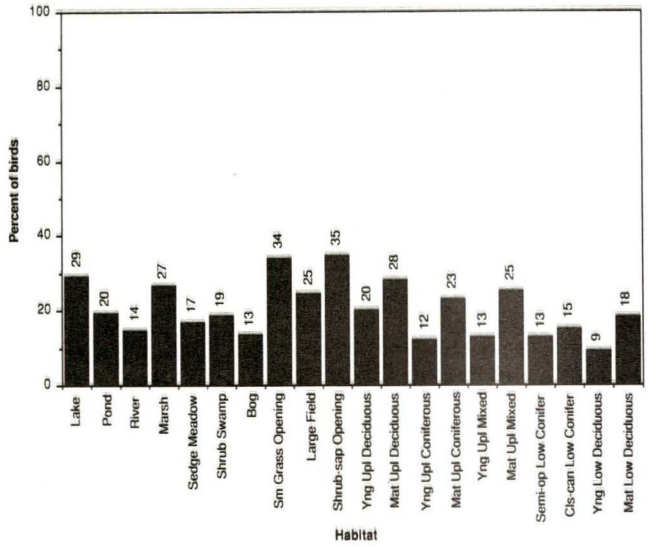

Figure 16.– *Habitat use by birds. Percent of all bird species that use each habitat.*

These different affinities are understandable when you think about what each class needs. Birds eat primarily insects, fruits, or seeds, which they can find in openings, wetlands, and forests. Their aerial mobility allows them to fill vertical as well as horizontal niches in their habitats. Mammals, which are less mobile than birds in terrestrial habitats, tend to forage on the ground. Mature forests and small openings may therefore be attractive to mammals because of the dense ground cover, plentiful seed and mast crops on the ground, and high prey populations. Many herps, on the other hand, are dependent on or adapted to water; for instance, lungless salamanders must keep their skin moist in order to breathe, and many frogs and turtles are specially equipped for underwater life. Aquatic and wetland habitats provide herps with places to find food, lay eggs, hibernate, and escape from enemies. The moisture of the thick forest litter may explain the herps' presence in mature forest types as well.

It is also interesting to compare the habitat use charts in terms of their overall scale. The bird chart (fig. 16) has a shallow profile, with short bars indicating that only a small percentage of total birds uses each habitat. The mammal (fig. 17) and herp (fig. 18) charts have taller bars,

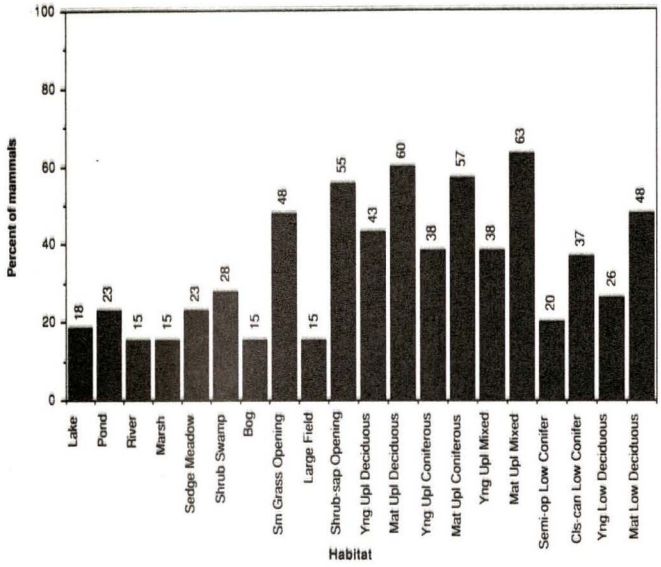

Figure 17.— *Habitat use by mammals. Percent of all mammal species that use each habitat.*

indicating that mammals and herps tend to use many different habitats. In fact, the four most popular mammal habitats are each used by more than 50 percent of all the mammal species. By contrast, the two most popular bird habitats attract only 33 percent and 34 percent of the total number of bird species. This seems to indicate that most birds tend to specialize in fewer habitats.

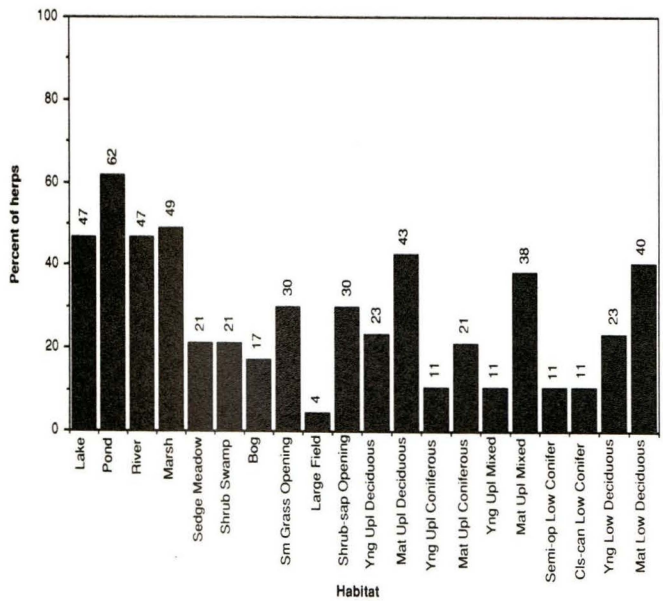

Figure 18.— *Habitat use by herps. Percent of all herp species that use each habitat.*

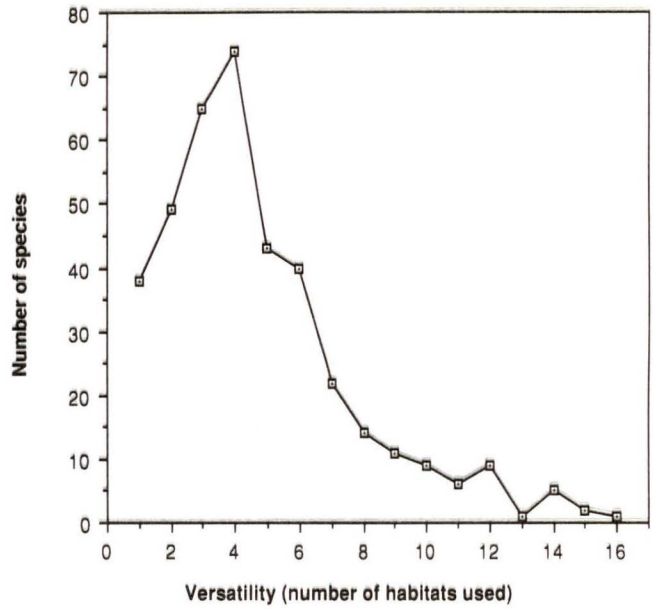

Figure 19.— *Species by versatility rating. Number of total species arranged by the number of habitats they use (versatility).*

One way to check this assumption is to look at versatility ratings. A species' versatility rating refers to the number of habitats it uses. The least versatile species use only one habitat; the most versatile species use as many as 16 of the 20 habitats. We have broken the versatility categories into three groups: low (1-3), intermediate (4-9), and high (10-16). As you can see in figures 19 and 20, most (92 percent) species use

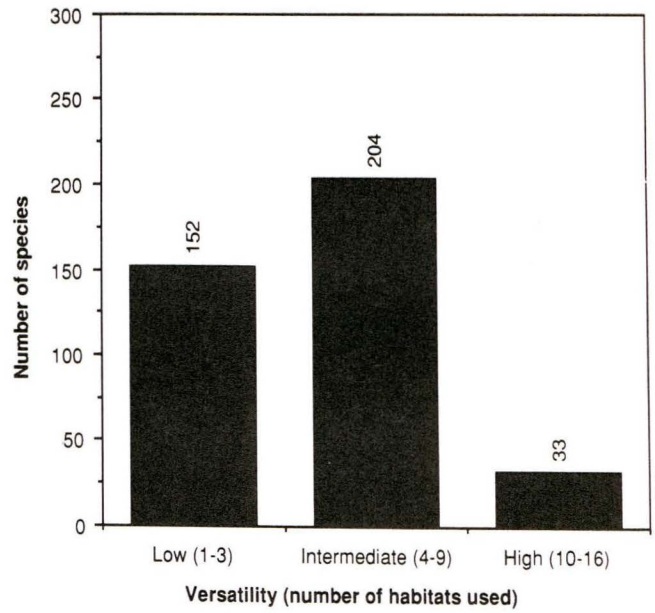

Figure 20.— *Species by versatility group. Number of total species in the low, intermediate, or high versatility group.*

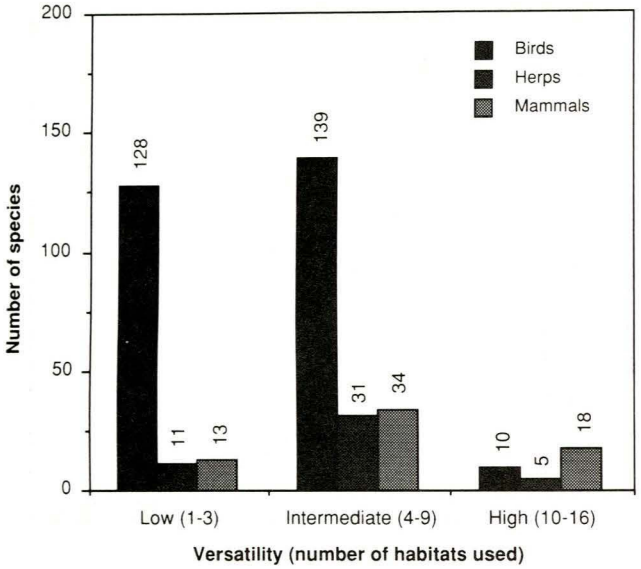

Figure 21.– *Versatility group by class. Number of birds, herps, and mammals in the low, intermediate, or high versatility group.*

between one and nine habitats. Figure 21 displays versatility ratings for birds, herps, and mammals. As we had surmised from the habitat use charts, most birds are in the low or intermediate versatility range. A relatively large proportion of mammals, however, use 10, 11, even 14

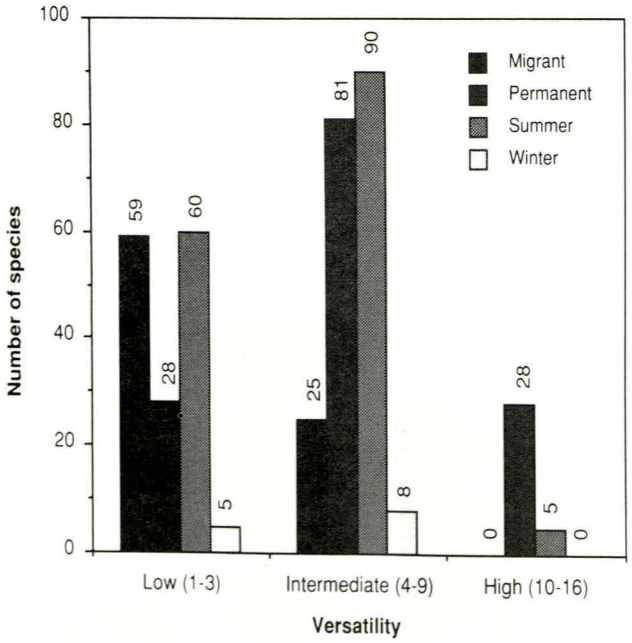

Figure 22.– *Versatility group by season of use. Number of species in various versatility groups that are migrants, permanent residents, summer residents, or winter visitors.*

different habitats. Herps, like mammals, also tend to be relatively more versatile than birds. Figure 22 shows that permanent species are more versatile than summer species, and that migrants and winter species are the least versatile, all using less than 10 habitats. In the same way, common species seem to be more versatile than uncommon and occasional species (fig. 23).

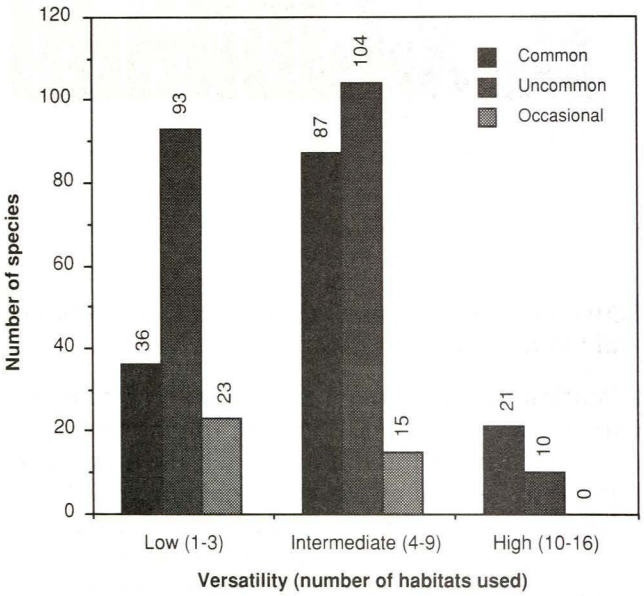

Figure 23.– *Versatility group by abundance. Number of species in various versatility groups that are common, uncommon, or occasional.*

The less versatile a species is, the greater the margin for errors in management. The Kirtland's warbler is a good example of a very specialized species; it nests only in jack pine forests between 6 and 23 years of age (corresponds to "shrub-sapling opening" and "young upland coniferous forest" in the NORTHWOODS data base). The importance of this habitat type has led managers to schedule jack pine harvests and regeneration programs that will ensure a continuing supply of jack pine habitat in this age class.

It is also interesting to look at the versatility classes in terms of habitat use. For ease of charting, we used the four major habitat groups to compare versatility classes. As you can see in figure 24, aquatic habitats are an important component for low and intermediate versatility

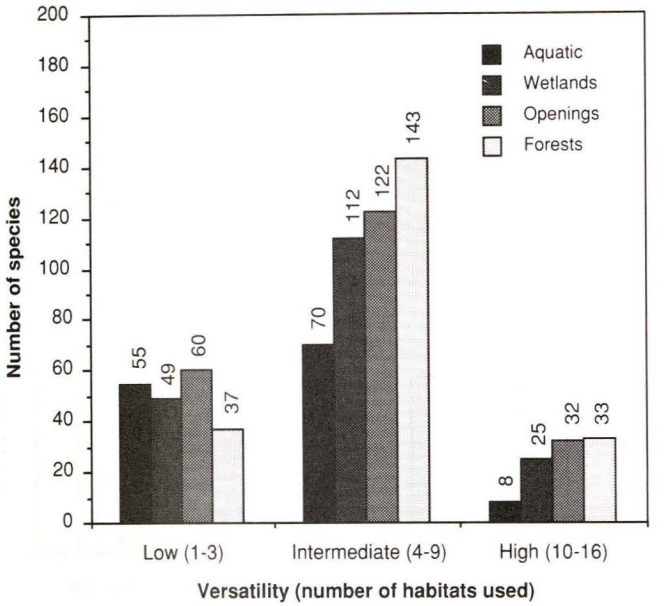

Figure 24.— *Versatility group by habitat group. Number of species in various versatility groups that use aquatic habitats, wetlands, openings, and/or forests.*

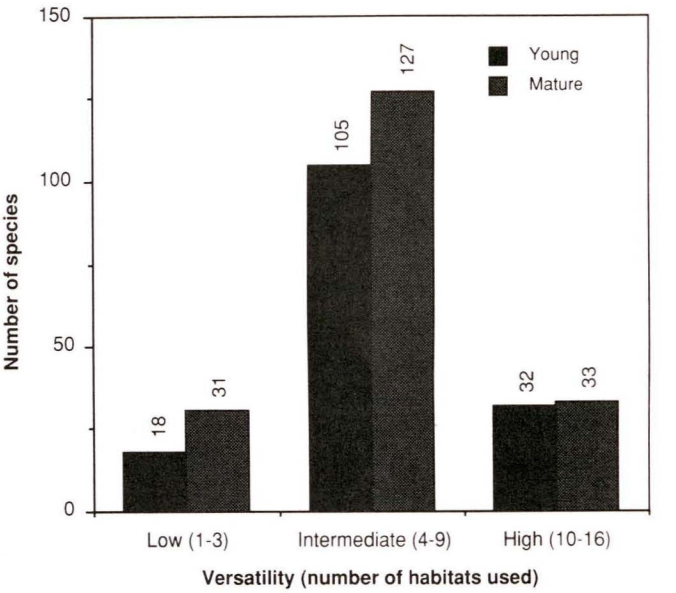

Figure 26.— *Versatility group by forest age. Number of species in various versatility groups that use young and/or mature forests.*

species, but less important for high versatility species. Forests become more important relative to other habitats as we move higher on the scale of versatility. (Versatility groups by forest type, age, and site are compared in figures 25-27).

Openings, which are used by all groups, appear to be especially important for low versatility species.

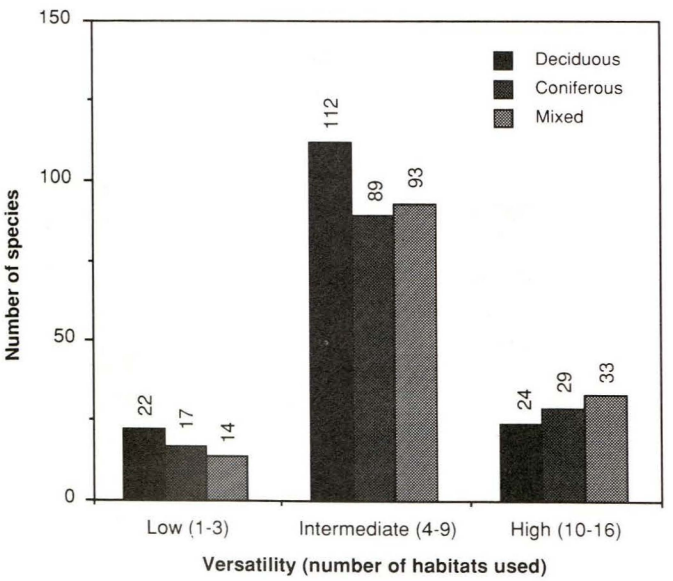

Figure 25.— *Versatility group by forest type. Number of species in various versatility groups that use deciduous, coniferous, and/or mixed forests.*

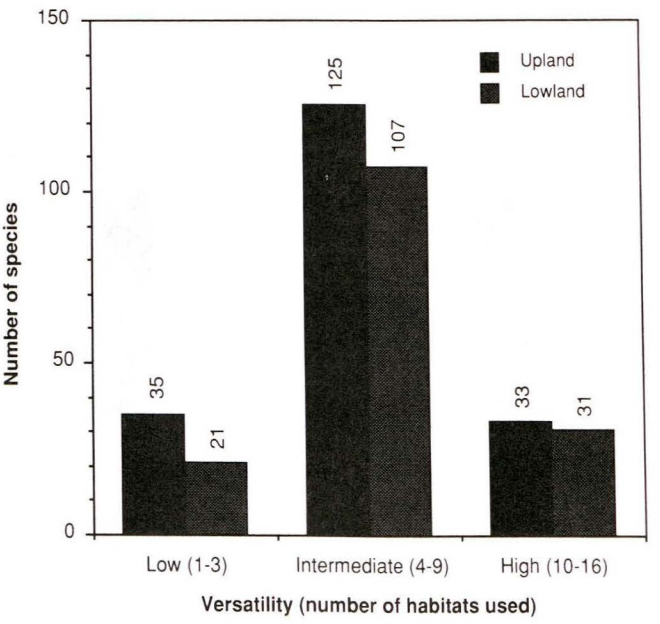

Figure 27.— *Versatility group by forest site. Number of species in various versatility groups that use upland and/or lowland forests.*

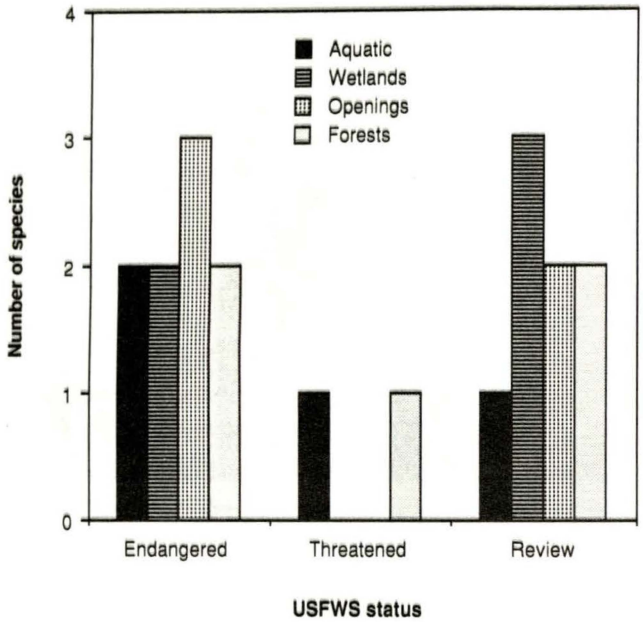

Figure 28.– *Number of special status species on the U.S. Fish and Wildlife Service's (USFWS) list that use aquatic habitats, wetlands, openings, and/or forests.*

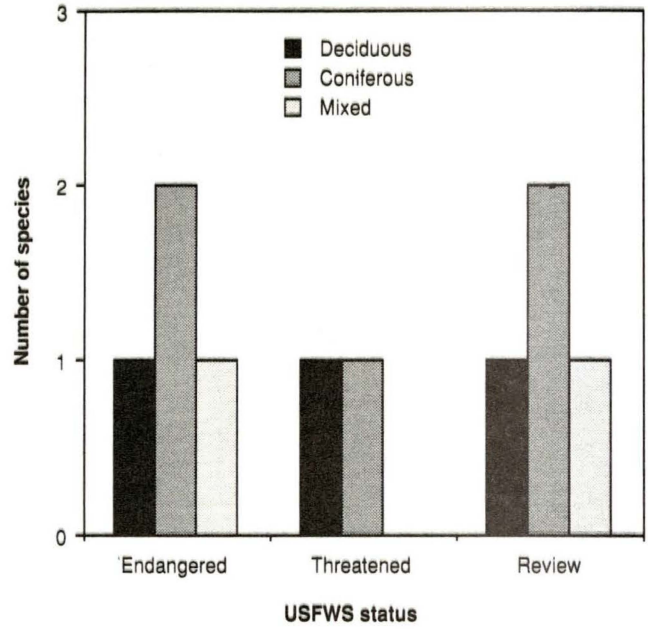

Figure 30.– *Number of special status species on the U.S. Fish and Wildlife Service's (USFWS) list that use deciduous, coniferous, and/or mixed forests.*

In some ways, habitat use patterns for special status species on the USFWS list (figs. 10, 28-31) follow the trend for all Lake States wildlife (fig. 9), *e.g.*, except for young upland coniferous, young forest types are not as important as mature forest types. There are differences, however, as you can see in habitat group rankings in figure 28. Among listed wildlife species, lowlands are

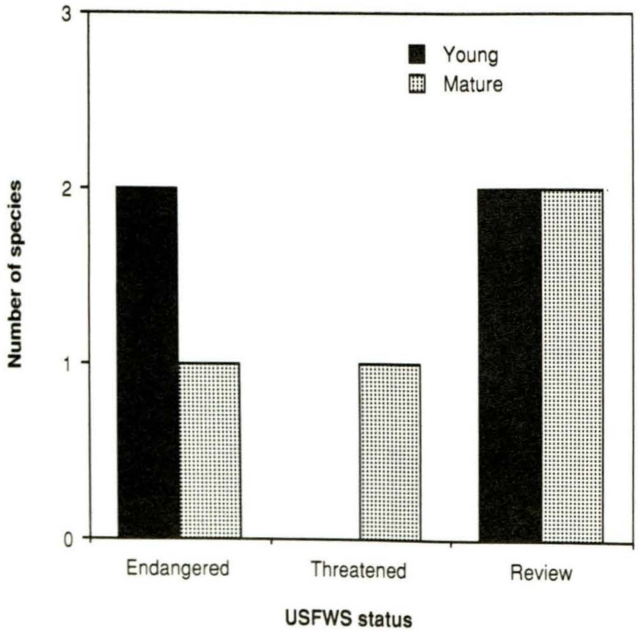

Figure 29.– *Number of special status species on the U.S. Fish and Wildlife Service's (USFWS) list that use young and/or mature forests.*

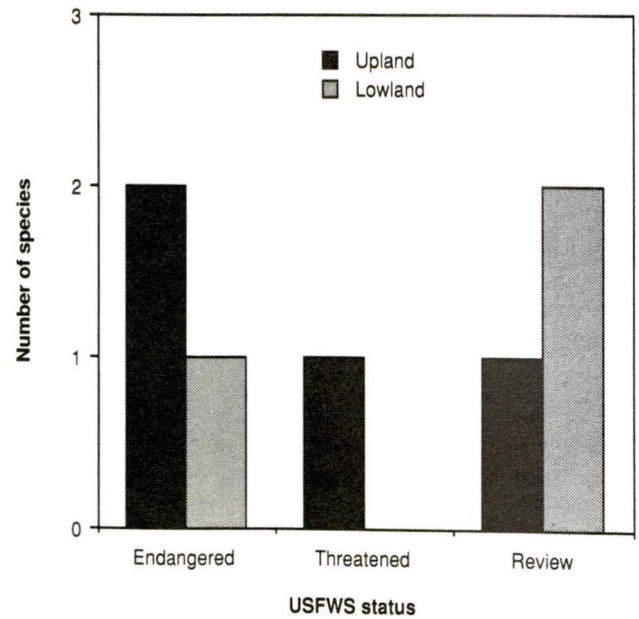

Figure 31.– *Number of special status species on the U.S. Fish and Wildlife Service's (USFWS) list that use upland and/or lowland forests.*

equally as important as uplands (fig. 31). Of all habitat types, the shrub-sapling opening is used by the greatest proportion of USFWS-listed species (fig. 10). As you can see, managing for the majority of Lake States species may not necessarily benefit some of these sensitive and less versatile species. Recognizing their unique needs can help us improve, maintain, and restore more of the habitats they depend on.

WAYS TO IMPROVE THE NORTHWOODS DATA BASE

We created NORTHWOODS to help managers make better use of what is currently known about Lake States wildlife. Because the information is standardized in a data base form, it is now possible to compare the needs of hundreds of species at once. The data base can also answer questions about planned changes in habitats because it predicts which species would benefit and which would be harmed by a change. However useful, NORTHWOODS is only a beginning—a foundation upon which more complex data can be added to answer more in-depth questions.

Because NORTHWOODS is available in electronic form, it can be easily customized to fit the needs of a particular agency, organization, or individual. The following list outlines ways in which this data base could be profitably expanded or improved.

1. **Add more habitats or more successional stages of existing habitats.** A finer breakdown of habitats would highlight differences and reveal why a habitat attracts certain communities of animals. Also, unique local habitats could be included in customized versions of the data base, thus helping to promote appreciation of these areas as wildlife habitats.

2. **Add a column called "special requirements."** Within a habitat, special habitat features must be present for certain types of wildlife are to survive there. Some examples of special requirements include snags, water sources, friable soil, and rocky crevices. A habitat can be ideal in every other way, but if it lacks one of these essential elements for nesting, feeding, or hiding, a species may not be able to exist there.

   NORTHWOODS would be greatly enriched if each species' special requirements were noted. These would serve as modifiers to the simple "present" or "absent" marks, giving one more set of criteria by which to judge suitability of a site. Even though a site may conform to the habitat definitions, the species will probably not be present if the "special requirements" are missing. Field surveys of possible management activity sites should be designed to look for these special features.

3. **Place new information into the cells.** Each cell (where a column and a row intersect) in the matrix has either an "**X**," which means "present," or a blank, which means "absent." Beyond a simple presence/absence system, several possible approaches would add more information to each cell.

   A. **Categorical:**
   - A habitat's suitability could be rated as optimum, suitable, or marginal;
   - the preferred habitat could be highlighted to distinguish it from other habitats used by the species;
   - a species' use of a habitat might be rated as low, medium, or high;
   - *how* the animal uses the habitat could be indicated, *e.g.*, feeding, breeding, or resting.

   B. **Indices:**
   A numerical system could be used to describe the intensity or use, or perhaps the population level of the species in each habitat. The ratings could be incremental along a continuum, resulting in numbers such as 1.4 or 2.04.

   C. **Density:**
   A density rating would describe the population of a species in relation to a given area of habitat, such as 10 woodland deer mice/hectare.

4. **Add fish, plants, or invertebrates to the data base.** Now that the structure of the data

base is in place, new records for other kinds of species can be easily added. Another way to expand the data base's usefulness is to link it to existing resource data bases or to a Geographic Information System (GIS) data base.

5. **Field check all entries to improve accuracy.** This data base is not a substitute for conducting professional field work, or for thoroughly checking each site proposed for management. Just because NORTHWOODS indicates that a species occurs in a given habitat, there is no guarantee that the species will be found in each example of that habitat. In fact, when data bases such as these have been tested in the field, the number of species actually found is sometimes lower than what is predicted for that habitat, particularly if the test area is small. On small sites, there may not be enough special requirements or the juxtaposition of habitat stages needed by the species. The larger the area, the greater the chance that it will contain all these elements, and that more of the potential species will be present. Other factors, including those not related to habitat; can also affect whether or not a species is present. The best way to verify a species' presence is to conduct field studies in the area using the NORTHWOODS data base for reference.

The data base and the visual profile painted from the data base represent only one step in the continuing effort to build informational tools for land managers. The authors welcome all efforts to further this work and thereby deepen our understanding of wildlife-habitat

HOW TO ACQUIRE A COPY OF THE NORTHWOODS DATA BASE

Northwoods is available in several file formats:

5.25-inch (360 kb) and 3.5-inch (720 kb) floppy disks for IBM-compatible microcomputers.

3.5-inch (720 kb) floppy disks for Macintosh microcomputers

Simply request "Northwoods Wildlife Habitat Database", RN-NC-359 indicating which kind of disk and microcomputer you require to:

USDA Forest Service
North Central Forest Experiment Station
1992 Folwell Avenue
St. Paul, MN 55108
Attn: Northwoods Database

Species Name	Scientific Name	Lake	Pond	River and stream	Marsh	Sedge meadow	Shrub swamp	Bog	Sm grass opening	Large field	Shrub-sap opening	Yng upl deciduous	Mat upl deciduous	Yng upl coniferous	Mat upl coniferous	Yng upl mixed	Mat upl mixed	Semi-open low conifer	Closed-can low conife	Yng lowl deciduous	Mat low deciduous	Regional abundance	Season of use	Chippewa	Superior	Chequamegon	Nicolet	Ottawa	Hiawatha	Huron-Manistee	Federal status	Versatility
BIRDS																																
Alder Flycatcher	*Empidonax alnorum*						X	X														c	s	u s	c s	cs	c s	c s	cs	us		2
American Bittern	*Botaurus lentiginosus*				X	X	X															c	s	c s	u s	us	u s	c s	cs	cs		3
American Black Duck	*Anas rubripes*	X	X	X	X		X		X													u	s	o s	u s	us	u s	c s	cs	cs		6
American Coot	*Fulica americana*	X	X		X																	c	s	c s	o s	cs	c s	u s	cs	cs		3
American Crow	*Corvus brachyrhynchos*						X	X	X		X		X		X	X	X		X		X	c	p	c s	c p	cp	c p	c s	cp	cp		#
American Goldfinch	*Carduelis tristis*						X		X	X	X											c	s	c s	c s	cs	c s	c s	cp	cp		4
American Kestrel	*Falco sparverius*					X			X	X	X											c	s	c s	c s	cs	c s	c s	cs	cs		4
American Redstart	*Setophaga ruticilla*										X	X	X			X	X			X	X	c	s	c s	c s	cs	c s	c s	cs	cs		7
American Robin	*Turdus migratorius*						X		X	X	X	X	X			X	X			X	X	c	s	c s	c s	cs	c s	c s	cs	cs		#
American Tree Sparrow	*Spizella arborea*						X	X	X		X											c	m	cm	cm	cm	c m	c m	cm	cm		4
American White Pelican	*Pelecanus erythrorhynchos*	X																				o	m	om								1
American Wigeon	*Anas americana*	X	X		X	X																u	m	c s	um	um	um	um	cs	cm		4
American Woodcock	*Scolopax minor*					X	X		X		X									X		c	s	c s	c s	cs	c s	c s	cs	cs		5
Baird's Sandpiper	*Calidris bairdii*	X	X		X	X																u	m		om				um	om		4
Bald Eagle	*Haliaeetus leucocephalus*	X		X									X		X							u	s	c s	c s	us	u s	u s	us	os	T	4
Bank Swallow	*Riparia riparia*	X	X	X	X	X			X													c	s	c s	o s	us	u s	c s	cs	cs		6
Barn Swallow	*Hirundo rustica*	X	X	X	X	X			X													c	s	c s	u s	cs	c s	c s	cs	cs		6
Barred Owl	*Strix varia*								X				X		X	X	X				X	c	p	c p	u p	cp	c p	c p	cp	cp		6
Bay-breasted Warbler	*Dendroica castanea*													X	X				X			c	s	c s	u s	um	um	u s	cm	cm		3
Belted Kingfisher	*Ceryle alcyon*	X	X	X	X																	c	s	c s	c s	cs	c s	c s	cs	cs		4
Black Phoebe	*Sayornis phoebe*								X	X	X	X	X	X	X	X	X					c	s	c s	u s	us	c s	c s	cs	us		9
Black Scoter	*Melanitta nigra*	X																				u	m		om			um		om		1
Black Tern	*Chlidonias niger*	X	X	X	X																	u	s	c s	u s	us	u s	u s	cs	cs		4
Black-and-white Warbler	*Mniotilta varia*						X				X	X	X			X	X			X	X	c	s	c s	c s	us	u s	c s	cs	cs		8
Black-backed Woodpecker	*Picoides arcticus*														X		X	X	X			u	p	u p	u p	op	o p	u p	up	op		4
Black-bellied Plover	*Pluvialis squatarola*	X	X	X					X													u	m	um	um	om	om	um	cm	cm		4
Black-billed Cuckoo	*Coccyzus erythropthalmus*										X	X	X	X		X	X				X	c	s	u s	u s	cs	c s	c s	cs	cs		7
Black-billed Magpie	*Pica pica*							X	X	X	X	X	X	X	X	X	X	X	X	X	X	o	p	o p								#
Black-capped Chickadee	*Parus atricapillus*						X				X	X	X	X	X	X	X	X	X	X	X	c	p	c p	c p	cp	c p	c p	cp	cp		#
Black-crowned Night-Heron	*Nycticorax nycticorax*				X																	o	m	om		um	o s		us	us		1
Black-throated Blue Warbler	*Dendroica caerulescens*										X	X	X	X			X	X				u	s	o s	u s	os	u s	u s	cs	us		6
Black-throated Green Warbler	*Dendroica virens*														X	X	X					c	s	c s	c s	cs	c s	c s	cs	cs		3
Blackburnian Warbler	*Dendroica fusca*														X		X		X			c	s	c s	c s	cs	c s	c s	cs	us		3
Blackpoll Warbler	*Dendroica striata*												X	X	X							u	m	cm	cm	um	um	um	cm	om		3
Blue Jay	*Cyanocitta cristata*								X		X	X	X	X	X	X	X	X	X	X	X	c	p	c p	c p	cp	c p	c p	cp	cp		#
Blue-gray Gnatcatcher	*Polioptila caerulea*					X	X		X		X	X	X	X	X	X	X					o	s							os		#
Blue-winged Teal	*Anas discors*		X		X	X	X		X	X												c	s	c s	um	cs	u s	c s	cs	cs		6
Blue-winged Warbler	*Vermivora pinus*										X											o	m				um			us		1
Bobolink	*Dolichonyx oryzivorus*					X				X												c	s	c s	u s	cs	u s	u s	cs	cs		2
Bohemian Waxwing	*Bombycilla garrulus*									X	X											o	w	u m	uw	ow	o w	ow	uw			2
Bonaparte's Gull	*Larus philadelphia*	X																				u	m	um	um	om	om	um	cs	cm		1
Boreal Chickadee	*Parus hudsonicus*							X							X		X	X	X			u	p	u p	u p	up	u p	u p	cp			5
Boreal Owl	*Aegolius funereus*						X	X						X	X			X	X			o	w	om	o p	ow	o w	ow	ow	ow		6
Brewer's Blackbird	*Euphagus cyanocephalus*									X	X											u	s	u s	u s	cs	c s	u s	cs	us		2

Species Name	Scientific Name	Lake	Pond	River and stream	Marsh	Sedge meadow	Shrub swamp	Bog	Sm grass opening	Large field	Shrub-sap opening	Yng upl deciduous	Mat upl deciduous	Yng upl coniferous	Mat upl coniferous	Yng upl mixed	Mat upl mixed	Semi-open low conifer	Closed-can low conifer	Yng lowl deciduous	Mat low deciduous	Regional abundance	Season of use	Chippewa	Superior	Chequamegon	Nicolet	Ottawa	Hiawatha	Huron-Manistee	Federal status	Versatility
Broad-winged Hawk	*Buteo platypterus*								X		X	X	X				X				X	c	s	cs	cs	cs	cs	cs	cs	cs		6
Brown Creeper	*Certhia americana*												X		X		X		X		X	u	s	up	us	us	us	up	cs	cs		5
Brown Thrasher	*Toxostoma rufum*										X	X				X						c	s	cs	us	us	us	cs	cs	cs		3
Brown-headed Cowbird	*Molothrus ater*								X	X	X	X	X	X	X	X				X		c	s	cs	us	cs	cs	cs	cs	cs		9
Buff-breasted Sandpiper	*Tryngites subruficollis*									X												u	m						um	om		1
Bufflehead	*Bucephala albeola*	X	X																			c	m	um	um	cm	cm	cm	cm	cm		2
Canada Goose	*Branta canadensis*	X	X		X					X												c	s	us	os	cm	cm	cs	cs	cs		4
Canada Warbler	*Wilsonia canadensis*							X			X	X	X			X	X			X	X	c	s	cs	cs	cs	cs	cs	cs	us		8
Canvasback	*Aythya valisineria*	X	X		X																	u	m	um	um	um	um	um	um	om		3
Cape May Warbler	*Dendroica tigrina*														X			X	X			u	s	us	us	us	us	um	um	cm		3
Caspian Tern	*Sterna caspia*	X																				u	m	um	us	om	um		us	cm		1
Cattle Egret	*Bubulcus ibis*				X				X													u	m				um					2
Cedar Waxwing	*Bombycilla cedrorum*						X		X		X	X	X			X	X			X		c	s	cp	cs	cs	cs	cs	cs	cs		8
Cerulean Warbler	*Dendroica cerulea*												X							X	X	o	s			os	os			os		3
Chestnut-sided Warbler	*Dendroica pensylvanica*						X				X	X				X						c	s	cs	cs	cs	cs	cs	cs	cs		4
Chimney Swift	*Chaetura pelagica*								X		X	X	X				X					u	s	us	os	us	us	cs	cs	cs		5
Chipping Sparrow	*Spizella passerina*								X		X		X		X			X	X			c	s	cs	cs	cs	cs	cs	cs	cs		6
Clay-colored Sparrow	*Spizella pallida*								X		X			X								u	s	cs	us	us	us	us	us	us		3
Cliff Swallow	*Hirundo pyrrhonota*	X	X	X	X	X			X													c	s	cs	os	cs	cs	us	cs	us		6
Common Goldeneye	*Bucephala clangula*	X	X	X	X								X								X	c	m	cs	cm	cm	cm	us	cm	up		6
Common Grackle	*Quiscalus quiscula*				X	X	X		X	X				X	X							c	s	cs	us	cs	cs	cs	cs	cs		7
Common Loon	*Gavia immer*	X		X																		u	s	cs	cs	us	us	us	us	os		2
Common Merganser	*Mergus merganser*	X	X	X	X	-																c	s	cs	us	us	us	cs	cs	cs		4
Common Moorhen	*Gallinula chloropus*				X	X																u	m	om						cs		2
Common Nighthawk	*Chordeiles minor*								X	X												c	s	cs	us	us	us	cs	cs	cs		2
Common Raven	*Corvus corax*								X	X	X		X		X		X	X	X		X	c	p	cp	cp	cp	cp	cp	cp	up		9
Common Redpoll	*Carduelis flammea*						X	X	X	X	X	X										u	w	cw	cw	uw	uw	uw	cw	cw		6
Common Snipe	*Gallinago gallinago*				X	X	X	X	X		X											c	s	cs	cs	cs	cs	cs	cs	cs		6
Common Tern	*Sterna hirundo*	X		X																		u	m	cs	um	um	um		us			2
Common Yellowthroat	*Geothlypis trichas*					X	X	X			X							X				c	s	cs	cs	cs	cs	cs	cs	cs		5
Connecticut Warbler	*Oporornis agilis*							X	X		X			X				X	X			u	s	us	us	us	us	us	um	cm		6
Cooper's Hawk	*Accipiter cooperii*								X		X	X				X	X				X	u	s	us	os	us	us	us	us	us		6
Dark-eyed Junco	*Junco hyemalis*								X		X			X				X				c	m	cm	us	cm	cm	cp	cs	cs		4
Dickcissel	*Spiza americana*								X	X												o	s			os	os			us		2
Double-crested Cormorant	*Phalacrocorax auritus*	X											X								X	u	m	um		us		om	us		3
Downy Woodpecker	*Picoides pubescens*						X				X	X	X		X		X				X	c	p	cp	cp	cp	cp	cp	cp	cp		7
Dunlin	*Calidris alpina*	X	X	X	X																	u	m	om	um	um		um	cm	cm		4
Eared Grebe	*Podiceps nigricollis*	X	X	X	X																	u	m	cm								4
Eastern Bluebird	*Sialia sialis*									X	X											u	s	us	os	us	us	us	us	cs		2
Eastern Kingbird	*Tyrannus tyrannus*						X		X	X	X	X										c	s	cs	cs	cs	cs	cs	cs	cs		5
Eastern Meadowlark	*Sturnella magna*									X												c	s	cs	us	us	us	cs	cs	cs		1
Eastern Screech-Owl	*Otus asio*								X				X				X				X	u	p			op	op	op	cp	cp		4
Eastern Wood-Pewee	*Contopus virens*											X	X								X	c	s	cs	cs	us	us	cs	cs	cs		3
European Starling	*Sturnus vulgaris*						X		X		X		X		X		X				X	c	p		up	cp	cp	cs	cs	cp		7

Species Name	Scientific Name	Lake	Pond	River and stream	Marsh	Sedge meadow	Shrub swamp	Bog	Sm grass opening	Large field	Shrub-sap opening	Yng upl deciduous	Mat upl deciduous	Yng upl coniferous	Mat upl coniferous	Yng upl mixed	Mat upl mixed	Semi-open low conifer	Closed-can low conifer	Yng lowl deciduous	Mat low deciduous	Regional abundance	Season of use	Chippewa	Superior	Chequamegon	Nicolet	Ottawa	Hiawatha	Huron-Manistee	Federal status	Versatility
Evening Grosbeak	*Coccothraustes vespertinus*													X	X		X		X			c	p	c p	c p	up	c p	c p	cp	cw		4
Field Sparrow	*Spizella pusilla*								X	X	X											u	s			us	u s	u s		cs		3
Forster's Tern	*Sterna forsteri*	X																				u	m	cm		um	om			cm		1
Fox Sparrow	*Passerella iliaca*										X	X		X	X	X						u	m	cm	um	cm	um	um	cm	cm		5
Franklin's Gull	*Larus pipixcan*	X							X													u	m	cm								2
Gadwall	*Anas strepera*				X																	u	m	um	um	um	um	um	cs	cm		1
Glaucous Gull	*Larus hyperboreus*	X																				u	m		u w							1
Golden Eagle	*Aquila chrysaetos*								X	X												o	m	om		ow		om				2
Golden-crowned Kinglet	*Regulus satrapa*														X		X	X	X			u	s	c p	c s	us	u s	u p	cs	us		4
Golden-winged Warbler	*Vermivora chrysoptera*								X		X	X	X									u	s	c s	o s	us	u s	u s	us	us		4
Grasshopper Sparrow	*Ammodramus savannarum*								X	X												u	s	u s	o s	os	o s	u s	cs	us		2
Gray Catbird	*Dumetella carolinensis*						X		X		X	X				X				X		c	s	c s	u s	cs	u s	u s	cs	cs		6
Gray Jay	*Perisoreus canadensis*														X		X	X	X			u	p	c p	c p	cp	c p	u p	cp			4
Gray-cheeked Thrush	*Catharus minimus*										X		X	X	X				X			u	m	cm	um	um	um	um	cm	cm		5
Great Black-backed Gull	*Larus marinus*	X																				o	w							ow		1
Great Blue Heron	*Ardea herodias*	X	X	X	X	X							X		X						X	c	s	c s	u s	cs	c s	c s	cs	cs		8
Great Crested Flycatcher	*Myiarchus crinitus*												X				X				X	c	s	c s	u s	cs	c s	u s	cs	cs		3
Great Egret	*Casmerodius albus*				X																	o	m	um		om	om					1
Great Gray Owl	*Strix nebulosa*								X	.	X						X	X	X			o	w	c p	o p	ow	ow	ow		ow		5
Great Horned Owl	*Bubo virginianus*					X	X	X	X		X	X	X	X	X	X	X		X		X	c	p	c p	c p	cp	c p	c p	cp	cp		#
Greater Scaup	*Aythya marila*	X																				u	m	cm	um	um	cm	um	cm	cm		1
Greater White-fronted Goose	*Anser albifrons*	X	X		X				X	X												o	m				om					5
Greater Yellowlegs	*Tringa melanoleuca*	X			X	X																u	m	cm	um	um	um	um	cm	cm		3
Green-backed Heron	*Butorides striatus*		X	X	X																	u	s	o s	o s	us	u s	u s	cs	cs		3
Green-winged Teal	*Anas crecca*	X	X		X	X	X															u	s	c s	um	us	u s	um	cs	os		5
Hairy Woodpecker	*Picoides villosus*												X		X		X				X	c	p	c p	c p	cp	c p	c p	cp	cp		4
Harris' Sparrow	*Zonotrichia querula*								X		X											u	m	cm	um	um	um	um				2
Henslow's Sparrow	*Ammodramus henslowii*								X	X												o	s						us	us		2
Hermit Thrush	*Catharus guttatus*										X		X	X	X		X		X			c	s	c s	c s	cs	c s	c s	cs	cs		6
Herring Gull	*Larus argentatus*	X		X																		c	m	c s	c p	cm	um	c s	cs	cp		2
Hoary Redpoll	*Carduelis hornemanni*						X	X	X	X												o	w	uw		ow	ow	ow	uw			4
Hooded Merganser	*Lophodytes cucullatus*	X	X	X	X								X				X				X	u	s	c s	c s	us	u s	c s	cs	us		7
Horned Grebe	*Podiceps auritus*	X	X		X																	u	m	c s	cm	um	um	um	cm	om		3
Horned Lark	*Eremophila alpestris*									X												c	s	c s	um	cs	cm	c s	cs	cp		1
House Finch	*Carpodacus mexicanus*											X	X				X					o	s							os		3
House Sparrow	*Passer domesticus*								X		X											c	p	c p	c p	cp	c p	c p	cp	cp		2
House Wren	*Troglodytes aedon*								X		X		X								X	c	s	c s	u s	cs	u s	c s	cs	cs		4
Hudsonian Godwit	*Limosa haemastica*	X	X		X	X																u	m							um		4
Indigo Bunting	*Passerina cyanea*								X		X	X										c	s	c s	u s	cs	c s	c s	cs	cs		3
Killdeer	*Charadrius vociferus*									X												c	s	c s	c s	cs	c s	c s	cs	cs		1
King Rail	*Rallus elegans*				X																	u	s							os		1
Kirtland's Warbler	*Dendroica kirtlandii*										X			X								u	s							os	E	2
Lapland Longspur	*Calcarius lapponicus*					X			X	X												u	m	ow	um	cm	um	um	cm	ow		3
Lark Sparrow	*Chondestes grammacus*									X												u	s	u s								1

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Le Conte's Sparrow	*Ammodramus leconteii*				X	X		X	X	X												u	s	o s	om	us	u s					5
Least Bittern	*Ixobrychus exilis*				X																	u	s	u s		us	u s	u s	cs	cs		1
Least Flycatcher	*Empidonax minimus*										X	X	X									c	s	c s	c s	cs	c s	c s	cs	cs		3
Least Sandpiper	*Calidris minutilla*	X	X	X	X																	u	m	um		um		um	cm	cm		4
Lesser Golden-Plover	*Pluvialis dominica*	X	X	X					X	X												u	m	om		um		um	cm	cm		5
Lesser Scaup	*Aythya affinis*	X		X	X																	c	m	cm	um	cm	cm	u s	cm	cm		3
Lesser Yellowlegs	*Tringa flavipes*	X			X	X																c	m	cm	um	cm	cm	um	cm	cm		3
Lincoln's Sparrow	*Melospiza lincolnii*						X	X			X							X	X			u	s	c s	o s	us	u s	u s	cs	cs		5
Loggerhead Shrike	*Lanius ludovicianus*								X	X	X											u	s	uw		os	om		us	os	R	3
Long-eared Owl	*Asio otus*					X	X	X	X	X	X	X		X	X		X					u	s	o s	o s	up	u s	um		us		#
Louisiana Waterthrush	*Seiurus motacilla*						X				X											u	s							os		2
Magnolia Warbler	*Dendroica magnolia*										X			X	X			X	X			u	s	o s	c s	us	u s	u s	cm	us		5
Mallard	*Anas platyrhynchos*	X	X	X	X	X			X	X												c	s	c s	c s	cs	c s	u s	cs	cs		7
Marbled Godwit	*Limosa fedoa*	X	X			X			X	X												u	m						um			5
Marsh Wren	*Cistothorus palustris*				X																	u	s	c s	o s	us	u s	u s	cs	cs		1
Merlin	*Falco columbarius*							X	X						X		X					o	s	o s	o s	um	om	u s				4
Mourning Dove	*Zenaida macroura*								X					X	X	X	X					u	s	u s	o s	us	u s	u s	cs	cs		5
Mourning Warbler	*Oporornis philadelphia*						X		X		X	X										c	s	c s	c s	cs	c s	u s	us	cs		4
Mute Swan	*Cygnus olor*	X			X																	o	m					om	os	up		2
Nashville Warbler	*Vermivora ruficapilla*							X			X	X	X	X	X	X	X					c	s	c s	c s	cs	c s	c s	cs	cs		8
Northern Cardinal	*Cardinalis cardinalis*										X		X									o	p			op	o p	u p		up		2
Northern Flicker	*Colaptes auratus*								X		X		X		X		X					c	s	c s	c s	cs	c s	c s	cs	cs		5
Northern Goshawk	*Accipiter gentilis*								X				X		X		X					u	p	u p	u s	up	u p	u s	cs	us		4
Northern Harrier	*Circus cyaneus*				X	X			X	X												c	s	c s	u s	cs	c s	u s	cs	us		4
Northern Hawk-Owl	*Surnia ulula*							X	X		X							X				o	w	ow	ow	ow						4
Northern Mockingbird	*Mimus polyglottos*										X	X										o	m					um		os		2
Northern Oriole	*Icterus galbula*												X								X	c	s	c s	o s	cs	c s	u s	cs	cs		2
Northern Parula	*Parula americana*												X		X		X		X			c	s	c s	c s	us	u s	c s	cs	os		4
Northern Pintail	*Anas acuta*				X																	u	m	om	cm	um	um	u s	cs	om		1
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X	X	X					X	X												u	s	c s	o s	us	u s	u s	us	us		5
Northern Saw-whet Owl	*Aegolius acadicus*								X		X	X	X	X	X	X	X	X	X	X	X	u	s	c p	u s	up	c s	u p	up	us		#
Northern Shoveler	*Anas clypeata*				X																	u	m	um	um	um	um	um	us	cm		1
Northern Shrike	*Lanius excubitor*								X	X	X	X										u	w	cw	uw	uw	uw	uw	uw	ow		4
Northern Waterthrush	*Seiurus noveboracensis*						X	X										X			X	c	s	c s	u s	cs	c s	u s	cs	cs		4
Oldsquaw	*Clangula hyemalis*	X																				o	m	om	um	om		um				1
Olive-sided Flycatcher	*Contopus borealis*														X				X			u	s	c s	u s	us	u s	c s	us	us		2
Orange-crowned Warbler	*Vermivora celata*						X				X	X				X				X		u	m	cm	um	um	um	um	um	om		5
Osprey	*Pandion haliaetus*	X	X	X									X		X				X			u	s	c s	u s	us	u s	u s	us	us		6
Ovenbird	*Seiurus aurocapillus*											X	X		X		X				X	c	s	c s	c s	cs	c s	c s	cs	cs		5
Palm Warbler	*Dendroica palmarum*						X	X	X		X											u	s	c s	o s	us	u s	u s	cs	us		4
Pectoral Sandpiper	*Calidris melanotos*	X	X	X	X																	u	m	cm		um		um	um	cm		4
Peregrine Falcon	*Falco peregrinus*	X		X	X				X	X												o	m	om	om	om	om	om			E	5
Philadelphia Vireo	*Vireo philadelphicus*										X	X	X			X						u	m	c p	u s	um	um	um	um	cm		4
Pied-billed Grebe	*Podilymbus podiceps*	X	X		X																	c	s	c s	um	cs	c s	u s	cs	cs		3

Species Name	Scientific Name	Lake	Pond	River and stream	Marsh	Sedge meadow	Shrub swamp	Bog	Sm grass opening	Large field	Shrub-sap opening	Yng upl deciduous	Mat upl deciduous	Yng upl coniferous	Mat upl coniferous	Yng upl mixed	Mat upl mixed	Semi-open low conifer	Closed-can low conifer	Yng lowl deciduous	Mat low deciduous	Regional abundance	Season of use	Chippewa	Superior	Chequamegon	Nicolet	Ottawa	Hiawatha	Huron-Manistee	Federal status	Versatility
Pileated Woodpecker	*Dryocopus pileatus*												X		X		X				X	c	p	c p	u p	up	c p	c p	cp	cp		4
Pine Grosbeak	*Pinicola enucleator*								X				X	X	X			X	X			u	w	cw	cw	ow	ow	uw	cw	ow		6
Pine Siskin	*Carduelis pinus*						X		X	X	X	X	X	X	X	X	X	X	X	X	X	u	s	c s	u s	uw	u s	u p	cw	ow		#
Pine Warbler	*Dendroica pinus*														X							c	s	c s	o s	us	c s	u s	cs	cs		1
Piping Plover	*Charadrius melodus*	X																				u	s		om				us	om	E	1
Prairie Warbler	*Dendroica discolor*										X											u	s							os		1
Prothonotary Warbler	*Protonotaria citrea*				X	X	X	X													X	u	s							us		5
Purple Finch	*Carpodacus purpureus*										X			X	X	X	X					c	s	c p	u s	cs	c s	c p	cp	cs		5
Purple Martin	*Progne subis*	X	X	X	X				X	X												c	s	c s	c s	us	u s	u s	cs	cs		6
Red Crossbill	*Loxia curvirostra*													X	X			X	X			u	p	c p	o s	up	u p	u p	cp	uw		4
Red-bellied Woodpecker	*Melanerpes carolinus*											X	X							X	X	u	p			up	u p			up		4
Red-breasted Merganser	*Mergus serrator*	X	X	X	X																	u	s	cm	u s	um	um	c s	cs	us		4
Red-breasted Nuthatch	*Sitta canadensis*														X		X		X			c	p	c p	c p	cp	c p	c p	cp	cp		3
Red-eyed Vireo	*Vireo olivaceus*										X	X	X			X	X			X	X	c	s	c s	c s	cs	c s	c s	cs	cs		7
Red-headed Woodpecker	*Melanerpes erythrocephalus*								X				X								X	u	s	c s	o s	us	u s	u s	us	us		3
Red-necked Grebe	*Podiceps grisegena*	X	X		X																	u	m	c s			om	um	um			3
Red-necked Phalarope	*Phalaropus lobatus*	X	X		X																	o	m	om	om							3
Red-shouldered Hawk	*Buteo lineatus*							X					X				X				X	u	s	o s		us	u s	u s	us	os		4
Red-tailed Hawk	*Buteo jamaicensis*					X			X	X	X	X	X				X					c	s	c s	u s	cs	c s	c s	cs	us		7
Red-throated Loon	*Gavia stellata*	X																				o	m	om			om	um				1
Red-winged Blackbird	*Agelaius phoeniceus*		X		X	X	X	X	X	X												c	s	c s	c s	cs	c s	c s	cs	cs		7
Redhead	*Aythya americana*	X	X		X																	u	m	c s	um	um	um	um	cs	om		3
Ring-billed Gull	*Larus delawarensis*	X		X						X												u	m	c s	um	um	um	u s	cs	cs		3
Ring-necked Duck	*Aythya collaris*	X	X	X	X	X	X	X														c	s	c s	c s	cs	c s	c s	cs	cs		7
Rock Dove	*Columba livia*								X	X												u	p		u p	up	u p			cp		2
Rose-breasted Grosbeak	*Pheucticus ludovicianus*											X	X			X	X			X	X	c	s	c s	c s	cs	c s	c s	cs	cs		6
Rough-legged Hawk	*Buteo lagopus*							X		X												u	m	cm	uw	uw	uw	um	um	cw		2
Ruby-crowned Kinglet	*Regulus calendula*										X				X		X	X	X			c	s	u p	c s	cs	c s	u s	cs	cs		5
Ruby-throated Hummingbird	*Archilochus colubris*							X	X		X											u	s	c s	u s	us	u s	u s	cs	cs		3
Ruddy Duck	*Oxyura jamaicensis*	X	X		X																	u	m	um		um	um	um		cm		3
Ruddy Turnstone	*Arenaria interpres*	X	X	X																		u	m	um				um	um	cm		3
Ruffed Grouse	*Bonasa umbellus*						X		X		X	X	X			X	X					c	p	c p	c p	cp	c p	c p	cp	cp		7
Rufous-sided Towhee	*Pipilo erythrophthalmus*								X		X	X	X									u	s	c s	om	us	u s	u s	cs	cs		4
Rusty Blackbird	*Euphagus carolinus*				X	X	X	X	X	X	X									X	X	c	m	cm	o s	cm		cm	cm			9
Sanderling	*Calidris alba*	X																				u	m					um	cm	cm		1
Sandhill Crane	*Grus canadensis*				X	X		X		X												u	s	om		us	u s	u s	cs	us		4
Savannah Sparrow	*Passerculus sandwichensis*					X				X												c	s	u s	o s	cs	u s	c s	cs	cs		2
Scarlet Tanager	*Piranga olivacea*												X				X				X	u	s	c s	u s	us	u s	u s	cs	cs		3
Sedge Wren	*Cistothorus platensis*				X	X	X															u	s	c s	u s	us	u s	u s	us	us		3
Semipalmated Plover	*Charadrius semipalmatus*	X	X	X					X	X												u	m	cm	um	um	um	um	cm	cm		5
Semipalmated Sandpiper	*Calidris pusilla*	X	X	X																		u	m	cm	um	um	um	um	cm			3
Sharp-shinned Hawk	*Accipiter striatus*								X	X			X		X		X					c	s	c s	c s	us	u s	c s	cs	us		5
Sharp-tailed Grouse	*Tympanuchus phasianellus*					X		X		X	X											u	p	o p	o p	up		u p	up			4
Sharp-tailed Sparrow	*Ammodramus caudacutus*					X			X	X												u	m	um				um	um			3

Species Name	Scientific Name	Lake	Pond	River and stream	Marsh	Sedge meadow	Shrub swamp	Bog	Sm grass opening	Large field	Shrub-sap opening	Yng upl deciduous	Mat upl deciduous	Yng upl coniferous	Mat upl coniferous	Yng upl mixed	Mat upl mixed	Semi-open low conifer	Closed-can low conifer	Yng lowl deciduous	Mat low deciduous	Regional abundance	Season of use	Chippewa	Superior	Chequamegon	Nicolet	Ottawa	Hiawatha	Huron-Manistee	Federal status	Versatility
Short-eared Owl	*Asio flammeus*					X			X	X												u	m	o s	o s	um	um	o w		om		3
Snow Bunting	*Plectrophenax nivalis*									X												c	w	c w	o w	c w	c w	c w	c w	c w		1
Snow Goose	*Chen caerulescens*	X								X												u	m	um	cm	cm	um	um	um	cm		2
Snowy Egret	*Egretta thula*	X	X	X	X																	o	m							os		4
Snowy Owl	*Nyctea scandiaca*								X	X								X				o	w	uw	uw	ow	ow	o w	ow	ow		3
Solitary Sandpiper	*Tringa solitaria*	X		X																		c	m	cm	o s	cm	um	cm	cm	cm		2
Solitary Vireo	*Vireo solitarius*												X		X		X					u	s	c s	u s	cs	c s	u s	cs	us		3
Song Sparrow	*Melospiza melodia*					X	X	X	X	X	X											c	s	c s	c s	cs	c s	c s	cs	cs		6
Sora	*Porzana carolina*				X	X																u	s	c s	o s	us	u s	u s	cs	cs		2
Spotted Sandpiper	*Actitis macularia*	X	X	X																		c	s	c s	cm	cs	c s	c s	cs	cs		3
Spruce Grouse	*Dendragapus canadensis*							X							X			X	X			u	p	u p	u p	up	u p	u p	cp	us		4
Stilt Sandpiper	*Calidris himantopus*		X		X																	u	m					um		om		2
Surf Scoter	*Melanitta perspicillata*	X																				o	m	om	om					om		1
Swainson's Thrush	*Catharus ustulatus*										X	X	X		X	X		X	X			c	s	c s	c s	us	u s	c s	cs			7
Swamp Sparrow	*Melospiza georgiana*				X	X	X	X														c	s	c s	c s	us	u s	c s	cs	cs		4
Tennessee Warbler	*Vermivora peregrina*						X	X			X	X	X	X	X		X	X				c	s	c s	u s	cm	cm	u s	cm	cm		9
Thayer's Gull	*Larus thayeri*	X																				u	m		u w							1
Three-toed Woodpecker	*Picoides tridactylus*														X				X			u	w		o p	op	u p		uw			2
Tree Swallow	*Tachycineta bicolor*	X	X	X	X	X	X	X	X	X												c	s	c s	c s	cs	c s	c s	cs	cs		9
Tufted Titmouse	*Parus bicolor*										X	X				X	X			X	X	o	p							up		6
Tundra Swan	*Cygnus columbianus*	X	X		X																	u	m	um	om	um	um	um	um	um		3
Turkey Vulture	*Cathartes aura*								X	X	X		X		X		X					u	s	c s	u s	us	u s	um	us	cs		6
Upland Sandpiper	*Bartramia longicauda*									X												u	s		o s	us	u s	u s	cs	cs		1
Varied Thrush	*Ixoreus naevius*												X		X		X		X		X	o	m		om							5
Veery	*Catharus fuscescens*						X				X	X	X			X	X				X	c	s	c s	c s	cs	c s	c s	cs	cs		7
Vesper Sparrow	*Pooecetes gramineus*									X												c	s	c s	o s	us	u s	c s	cs	cs		1
Virginia Rail	*Rallus limicola*				X	X																u	s	u s		us	u s	u s	us	cs		2
Warbling Vireo	*Vireo gilvus*											X	X								X	u	s	c s	o s	us	u s	u s	cs	cs		3
Water Pipit	*Anthus spinoletta*				X				X	X												u	m	um	om	um	um	um	cm	om		3
Western Grebe	*Aechmophorus occidentalis*	X	X		X																	o	m	om	om							3
Western Kingbird	*Tyrannus verticalis*								X	X	X											u	s	u s	om							3
Western Meadowlark	*Sturnella neglecta*									X												u	s	u s		us	u s	u s		os		1
Western Sandpiper	*Calidris mauri*	X	X	X																		u	m	um	om							3
Whimbrel	*Numenius phaeopus*	X	X		X	X																u	m						um			4
Whip-poor-will	*Caprimulgus vociferus*								X				X									u	s	u s	o s	us	u s	c s	cs	cs		2
White-breasted Nuthatch	*Sitta carolinensis*											X	X				X			X	X	c	p	c p	o p	cp	c p	c p	cp	cp		5
White-crowned Sparrow	*Zonotrichia leucophrys*						X			X	X	X										u	m	cm	um	um	um	um	cm	cm		4
White-rumped Sandpiper	*Calidris fuscicollis*	X			X																	u	m		um	um			um	om		2
White-throated Sparrow	*Zonotrichia albicollis*						X				X							X	X			c	s	c s	c s	cs	c s	c s	cs	cs		4
White-winged Crossbill	*Loxia leucoptera*													X	X			X	X			u	w	u p	uw	ow	ow	u p	cp	uw		4
White-winged Scoter	*Melanitta fusca*	X																				u	m		om		um	um		om		1
Wild Turkey	*Meleagris gallopavo*								X		X	X	X				X					u	p				u p		up	cp		5
Willet	*Catoptrophorus semipalmatus*	X		X																		o	m	om								2
Willow Flycatcher	*Empidonax traillii*						X	X			X							X		X		o	s			os				us		5

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Wilson's Phalarope	*Phalaropus tricolor*	X	X		X																	o	m	om				um				3
Wilson's Warbler	*Wilsonia pusilla*						X	X			X											u	m	cm	o s	um	um	um	cm	cm		3
Winter Wren	*Troglodytes troglodytes*						X				X				X			X	X	X		u	s	c s	c s	us	u s	u s	us	os		6
Wood Duck	*Aix sponsa*	X	X	X	X		X						X				X				X	c	s	c s	u s	cs	c s	c s	cs	cs		8
Wood Thrush	*Hylocichla mustelina*												X				X				X	c	s	c s	o s	cs	c s	u s	cs	us		3
Yellow Rail	*Coturnicops noveboracensis*				X	X																u	s	um	o s		u s		us	os		2
Yellow Warbler	*Dendroica petechia*						X				X											c	s	c s	u s	cs	c s	u s	cs	cs		2
Yellow-bellied Flycatcher	*Empidonax flaviventris*														X			X	X			u	s	c s	u s	us	u s	u s	us			3
Yellow-bellied Sapsucker	*Sphyrapicus varius*											X	X				X				X	c	s	c s	c s	cs	c s	c s	cs	cs		4
Yellow-billed Cuckoo	*Coccyzus americanus*										X	X	X							X	X	u	s	u s		us	u s	u s	cs	us		5
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*				X	X			X	X												u	s	u s	o s	us	u s	u s	us			4
Yellow-rumped Warbler	*Dendroica coronata*										X			X	X		X	X	X			c	s	c s	c s	cs	c s	c s	cs	cs		6
Yellow-throated Vireo	*Vireo flavifrons*										X	X	X			X	X			X	X	u	s	c s		us	u s			us		7
HERPS																																
American Toad	*Bufo americanus*		X		X	X	X		X		X	X	X			X	X			X	X	c	p	c p	c p	cp	c p	c p	cp	cp		#
Blanding's Turtle	*Emydoidea blandingii*	X	X	X	X																	u	p				u p	u p		up		4
Blue-spotted Salamander	*Ambystoma laterale*		X		X								X				X				X	c	p	c p	u p	cp	c p	u p	cp	cp		5
Bullfrog	*Rana catesbeiana*	X	X	X	X																	u	p			cp	c p	u p	cp	up		4
Common Garter Snake	*Thamnophis sirtalis*				X	X			X		X	X	X	X	X	X	X			X	X	c	p	c p	c p	cp	c p	u p	cp	cp		#
Eastern Box Turtle	*Terrapene carolina*										X	X								X	X	u	p							op		4
Eastern Hognose Snake	*Heterodon platyrhinos*								X		X			X	X		X	X				u	p	c p	u p		c p			up		6
Eastern Newt	*Notophthalmus viridescens*	X	X	X	X								X		X		X				X	u	p	c p	u p	up	u p	u p	cp	up		8
Eastern Ribbon Snake	*Thamnophis sauritus*	X	X	X																		u	p							up		3
Five-lined Skink	*Eumeces fasciatus*								X		X		X		X		X				X	u	p				u p	u p		cp		6
Four-toed Salamander	*Hemidactylium scutatum*		X					X				X	X							X	X	u	p			up	u p	u p	cp	up		6
Fox Snake	*Elaphe vulpina*					X	X				X	X	X								X	c	p			cp	u p	c p	cp			6
Gray Treefrog	*Hyla versicolor*	X	X	X	X	X	X					X	X		X		X				X	c	p	c p	c p	cp	c p	c p	cp	cp		#
Green Frog	*Rana clamitans*	X	X	X	X																	c	p	c p	c p	cp	c p	c p	cp	up		4
Jefferson's Salamander	*Ambystoma jeffersonianum*	X	X		X								X				X				X	u	p						cp			6
Map Turtle	*Graptemys geographica*	X		X																		u	p							up		2
Massasauga	*Sistrurus catenatus*			X	X		X	X														u	p							op	R	4
Milk Snake	*Lampropeltis triangulum*								X		X									X	X	u	p							up		4
Mink Frog	*Rana septentrionalis*	X	X	X	X		X	X														c	p	c p	u p	cp	c p	u p	cp			6
Mudpuppy	*Necturus maculosus*	X	X	X																		c	p	c p	c p	cp	c p	u p	cp	up		3
Northern Brown Snake	*Storeria dekayi*								X		X	X	X			X	X					u	p			up	u p			cp		6
Northern Cricket Frog	*Acris crepitans*	X	X	X	X																	u	p							cp		4
Northern Leopard Frog	*Rana pipiens*	X	X	X	X	X	X	X	X													u	p	c p	u p	up	u p	c p	cp	cp		8
Northern Water Snake	*Nerodia sipedon*	X	X	X	X			X														u	p			up	u p		cp	cp		5
Painted Turtle	*Chrysemys picta*	X	X	X	X																	c	p	c p	u p	cp	c p	c p	cp	cp		4
Pickerel Frog	*Rana palustris*	X	X	X	X	X	X	X	X													u	p					u p	cp	up		8
Plainbelly Water Snake	*Nerodia erythrogaster*							X										X	X			u	p							up		3
Prairie Skink	*Eumeces septentrionalis*								X	X	X	X	X	X	X		X	X				u	p	c p		up						9
Queen Snake	*Regina septemvittata*	X	X	X																		u	p							up		3
Racer	*Coluber constrictor*								X	X								X	X			u	p							cp		4
Rat Snake	*Elaphe obsoleta*												X				X				X	u	p							op		3

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Redback Salamander	*Plethodon cinereus*												X				X					c	p	up	cp	cp	cp	cp	cp	cp		2
Redbelly Snake	*Storeria occipitomaculata*						X		X		X	X	X	X	X	X	X		X	X	X	u	p	up	up	cp	up	up	cp			#
Ringneck Snake	*Diadophis punctatus*								X		X	X	X				X					u	p		up	up	up	up	cp	up		5
Smooth Green Snake	*Opheodrys vernalis*								X		X											u	p	up		cp	up	up	cp	cp		2
Snapping Turtle	*Chelydra serpentina*	X	X	X	X																	c	p	cp	up	cp	cp	up	cp	cp		4
Spiny Softshell	*Trionyx spiniferus*	X	X	X																		u	p	up			up			up		3
Spotted Salamander	*Ambystoma maculatum*		X										X		X		X					u	p		cp	up	cp	up		cp		4
Spotted Turtle	*Clemmys guttata*	X	X	X	X																	u	p							up		4
Spring Peeper	*Hyla crucifer*	X	X		X	X	X	X											X	X	X	c	p	cp	cp	cp	cp	cp	cp	cp		9
Stinkpot	*Sternotherus odoratus*	X	X	X														X	X	X	X	u	p							cp		7
Striped Chorus Frog	*Pseudacris triseriata*		X		X	X																u	p	cp	cp	cp				cp		3
Tiger Salamander	*Ambystoma tigrinum*		X		X	X	X				X		X				X			X	X	u	p	cp	up		up			cp		9
Tremblay's Salamander	*Ambystoma tremblayi*		X								X	X	X	X	X	X	X			X	X	u	p			up	up					#
Wood Frog	*Rana sylvatica*		X		X								X		X		X			X	X	c	p	cp	cp	cp	cp	up	cp	cp		7
Wood Turtle	*Clemmys insculpta*		X	X	X	X			X				X								X	u	p		op	up	up	up	cp	cp		7
Woodhouse's Toad	*Bufo woodhousii*	X		X																		u	p							up		2
MAMMALS																																
Arctic Shrew	*Sorex arcticus*					X	X	X										X	X			u	p	op	cp	up	up	up	cp			5
Badger	*Taxidea taxus*									X	X											u	p	up		up	up	up	up	up		2
Beaver	*Castor canadensis*	X	X	X	X		X				X	X	X			X	X			X		c	p	cp	cp	cp	cp	cp	cp	cp		#
Big Brown Bat	*Eptesicus fuscus*	X	X		X				X		X		X		X		X		X		X	u	p	cp	cp	up	up	up	cp	cp		#
Black Bear	*Ursus americanus*								X		X	X	X	X	X	X	X		X	X	X	c	p	cp	cp	cp	cp	cp	cp	up		#
Bobcat	*Felis rufus*						X				X	X	X	X	X		X	X	X		X	u	p	up	up	up	up	up	cp	up		#
Coyote	*Canis latrans*					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	c	p	cp	up	cp	cp	cp	cp	cp		#
Deer Mouse	*Peromyscus maniculatus*								X		X	X	X	X	X	X	X			X	X	c	p	cp	cp	cp	cp	cp	cp	cp		#
Eastern Chipmunk	*Tamias striatus*								X		X	X	X			X	X					c	p	cp	cp	cp	cp	cp	cp	cp		6
Eastern Cottontail	*Sylvilagus floridanus*								X		X											u	p	cp		up	up	up	up	cp		2
Eastern Mole	*Scalopus aquaticus*								X	X	X					X	X					u	p							cp		5
Eastern Pipistrelle	*Pipistrellus subflavus*	X	X	X									X		X		X		X		X	u	s			os		up				8
Eastern Spotted Skunk	*Spilogale putorius*								X		X											o	p	op								2
Ermine	*Mustela erminea*						X	X	X		X	X	X	X	X	X	X				X	c	p	cp	cp	cp	cp	cp	cp	up		#
Fisher	*Martes pennanti*												X		X		X		X		X	u	p	up	cp	cp	cp	up	up			5
Fox Squirrel	*Sciurus niger*												X				X					u	p	cp		up			up	cp		2
Franklin's Ground Squirrel	*Spermophilus franklinii*								X	X	X		X		X		X					u	p	up	up							6
Gray Fox	*Urocyon cinereoargenteus*										X	X	X		X	X	X		X			u	p	op	op	up	up	up	up	up		7
Gray Squirrel	*Sciurus carolinensis*												X				X				X	u	p	cp	op	up	cp	up	cp	cp		3
Gray Wolf	*Canis lupus*					X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	u	p	up	cp	up	op	op	op		E	#
Heather Vole	*Phenacomys intermedius*							X						X	X			X				o	p	op								4
Hoary Bat	*Lasiurus cinereus*	X	X										X		X		X		X		X	u	s	us	up	os	os	up	cs	up		7
House Mouse	*Mus musculus*								X													u	p			up	up	up		up		1
Keen's Myotis	*Myotis keenii*	X	X						X				X		X		X		X		X	u	p	us	us	up	up	up	cp	up		8
Least Chipmunk	*Tamias minimus*										X	X	X	X	X	X	X					u	p	cp	cp	cp	cp	cp	cp			7
Least Weasel	*Mustela nivalis*						X		X		X											u	p	cp	up	up	up	up	up	cp		3
Little Brown Myotis	*Myotis lucifugus*												X		X		X		X		X	c	p	cp	up	cs	cs	cp	cp	cp		5
Long-tailed Weasel	*Mustela frenata*						X	X	X		X	X	X	X	X	X	X			X	X	c	p	cp		cp	cp	cp	cp	cp		#

Species Name	Scientific Name	Lake	Pond	River and stream	Marsh	Sedge meadow	Shrub swamp	Bog	Sm grass opening	Large field	Shrub-sap opening	Yng upl deciduous	Mat upl deciduous	Yng upl coniferous	Mat upl coniferous	Yng upl mixed	Mat upl mixed	Semi-open low conifer	Closed-can low conifer	Yng lowl deciduous	Mat low deciduous	Regional abundance	Season of use	Chippewa	Superior	Chequamegon	Nicolet	Ottawa	Hiawatha	Huron-Manistee	Federal status	Versatility
Lynx	*Felis lynx*						X				X	X	X	X	X		X		X		X	o	p	o p	u p	up	o w	o w			R	9
Marten	*Martes americana*													X	X	X	X		X			u	p		u p	up	u p	u p	up			5
Masked Shrew	*Sorex cinereus*					X	X		X		X	X	X	X	X	X	X	X	X	X	X	c	p	u p	c p	cp	c p	c p	cp	cp		#
Meadow Jumping Mouse	*Zapus hudsonius*					X			X		X											c	p	u p	c p	cp	u p	c p	cp	cp		3
Meadow Vole	*Microtus pennsylvanicus*				X	X			X	X	X											c	p	c p	c p	cp	c p	c p	cp	cp		5
Mink	*Mustela vison*		X	X	X	X	X															c	p	c p	c p	cp	c p	c p	cp	cp		5
Moose	*Alces alces*	X	X		X		X		X		X	X	X	X	X	X		X	X	X		u	p	o p	c p			o p	up			#
Muskrat	*Ondatra zibethicus*	X	X	X	X																	c	p	c p	c p	cp	c p	c p	cp	cp		4
Northern Bog Lemming	*Synaptomys borealis*					X		X										X	X			u	p	u p							R	4
Northern Flying Squirrel	*Glaucomys sabrinus*												X		X		X				X	c	p	c p	c p	cp	u p	c p	cp	up		4
Northern Short-tailed Shrew	*Blarina brevicauda*					X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	c	p	c p	c p	cp	c p	c p	cp	cp		#
Norway Rat	*Rattus norvegicus*								X													u	p			up	u p			up		1
Plains Pocket Gopher	*Geomys bursarius*								X	X	X	X		X		X						u	p	c p		up						6
Porcupine	*Erethizon dorsatum*												X	X	X		X		X			c	p	c p	u p	cp	c p	u p	cp	cp		5
Prairie Vole	*Microtus ochrogaster*								X	X												u	p	c p								2
Pygmy Shrew	*Sorex hoyi*								X		X	X	X	X	X	X	X					u	p	u p	c p	up	u p	u p				8
Raccoon	*Procyon lotor*		X	X	X	X	X		X		X	X	X		X		X				X	c	p	c p	u p	cp	c p	c p	cp	cp		#
Red Bat	*Lasiurus borealis*	X	X										X		X		X				X	u	s	u s	u p	us	u s	u p	cs	cp		6
Red Fox	*Vulpes vulpes*					X			X	X	X	X		X		X				X		c	p	c p	c p	up	u p	c p	cp	cp		8
Red Squirrel	*Tamiasciurus hudsonicus*														X		X		X			c	p	c p	c p	cp	c p	c p	cp	cp		3
River Otter	*Lutra canadensis*	X	X	X	X																	c	p	c p	c p	cp	c p	c p	cp	up		4
Rock Vole	*Microtus chrotorrhinus*			X										X	X							u	p		u p							3
Silver-haired Bat	*Lasionycteris noctivagans*	X	X	X									X		X		X				X	u	s	u s	u s	os	o s	u p	cp	up		7
Snowshoe Hare	*Lepus americanus*						X				X	X	X	X	X	X	X	X	X	X	X	c	p	c p	c p	cp	c p	c p	cp			#
Southern Bog Lemming	*Synaptomys cooperi*					X		X										X	X			u	p	u p	u p	up	u p	u p	cp	cp		4
Southern Flying Squirrel	*Glaucomys volans*												X		X		X				X	u	p			up	u p	u p		cp		4
Southern Red-backed Vole	*Clethrionomys gapperi*										X	X	X	X	X	X	X	X	X	X	X	c	p	c p	c p	cp	c p	c p	cp	cp		#
Star-nosed Mole	*Condylura cristata*		X		X	X	X	X													X	u	p	c p	u p	up	u p	u p	cp	up		6
Striped Skunk	*Mephitis mephitis*								X	X	X	X	X	X	X	X	X					c	p	c p	c p	cp	c p	c p	cp	cp		9
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*									X												u	p	c p		cp	c p	u p	up	cp		1
Virginia Opossum	*Didelphis virginiana*	X	X	X					X		X	X	X			X	X			X	X	u	p					u p		cp		#
Water Shrew	*Sorex palustris*	X	X	X	X	X	X													X	X	u	p	u p	c p	up	u p	u p	cp	up		8
White-footed Mouse	*Peromyscus leucopus*								X		X	X	X	X	X	X	X			X	X	c	p	c p		cp	c p			cp		#
White-tailed Deer	*Odocoileus virginianus*					X	X		X		X	X	X	X	X	X	X	X	X	X	X	c	p	c p	c p	cp	c p	c p	cp	cp		#
Woodchuck	*Marmota monax*								X		X	X		X								c	p	c p	c p	cp	c p	c p	cp	cp		4
Woodland Jumping Mouse	*Napaeozapus insignis*										X	X	X		X		X				X	u	p	c p	c p	up	u p	u p	cp			6
Woodland Vole	*Microtus pinetorum*											X	X			X	X			X	X	u	p							cp		6

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Wildlife habitat data from seven Great Lakes National Forests were combined into a wildlife-habitat matrix named NORTHWOODS. The composite NORTHWOODS data base is summarized. Multiple queries of NORTHWOODS were used to profile the wildlife community of the Upper Great Lakes region.

KEY WORDS: Wildlife, habitat, NORTHWOODS, Great Lakes, community, profile.

Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.